MAINSTREAMING DISASTER RISK REDUCTION INTO COMMUNITY DEVELOPMENT IN THE WINDWARD ISLANDS

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Abstract

The Windward Islands are vulnerable to a number of natural hazards. This thesis examines the possibilities for Disaster Risk Reduction (DRR) in the Windward Islands. The Windward Islands offer a special case of “Island Vulnerability”. Island vulnerability is essentially defined as an increased probability in disaster events against what would be expected if vulnerability were to be measured against international levels of poverty, defined as Gross National Product per capita. There are three reasons for this namely the topography of islands, the site characteristics and the socio-economic setting. The topography is one where islands, largely of volcanic or coral origins, face multi-hazard experience particularly from flooding and storm surge. The site issue is that islands usually have a high ratio of coastline to land mass implying a relatively higher exposure to extreme events. The socio-economic conditions are peculiar to island including isolation, mono-agriculture and mono-industry essentially laid down by colonial experience, an absence of formal employment opportunities and weak capacity in local governance including the absence of NGOs.

Though DRR has evolved over the last 20 years, some islands and communities remain more vulnerable than others. This research investigates the mainstreaming of DRR in the Windward Islands of Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines. The key issue researched was whether DRR could be effectively implemented at the community level. To address this issue, the research investigates the vulnerability and capacity of communities to hazards in the Windward Islands and suggests ways to reduce risk and build community resilience. The factors affecting vulnerability and capacity to hazards in the Anglophone Windward Islands were identified as a means of determining how to reduce risks and build resilience to hazards in the Windward Islands. Efforts to enhance community development and build resilience are not effective as they fail to address fully community needs. This research concluded that some communities are more vulnerable than others and a major contributor to their vulnerability is poverty.

None of the methods used in this research are unique to island vulnerability analysis as they have been applied elsewhere in DRR. What is unique is the scoping of the application of these methods to gain an overview of DRR possibilities. What emerges as a conclusion is the limited impact of top down interventions, especially those interventions that try to address poverty alleviation to lower risk. This is essentially because the poor themselves barricade their own coping mechanisms against external interventions, thus building a wall against external help. Building on local organisational capacity, including religious groups, can help address this problem. Research in this area is limited for the Anglophone Windward Islands and this thesis on vulnerability of household and communities will contribute to knowledge in this field.

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Dedication

I dedicate this thesis to my Mom, Pamela Ferdinand and Dad, Eldon Wilson who taught me the value of education, they have been my rock supporting me every step of the way. Thank you so much for your love and support. This is for all your hard work.

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"The smallest act of kindness is worth more than the grandest intention"
Oscar Wilde.

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Heartfelt thanks to all, Idelia M.A. Ferdinand (2013)

Author's Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the University Ethics Committee in May 2011.

The total word count for this thesis is 83, 274 words.

Name: Idelia M. A. Ferdinand

Signature:

Date: April 2013

Acronyms and Abbreviations

AA	Arctic Amplification
AIMS	African, Indian Ocean, Mediterranean and South China Seas
AOSIS	Alliance of Small Island States
ART	Agency for Rural Transformation
BCPR	Bureau for Crisis Prevention and Recovery
BPoA	Barbados Programme of Action
BTOOL	Benchmarking Tool
CARICOM	Caribbean Community
CBDM	Community Based Disaster Management
CBDM	Community Based Disaster Management
CBDRM	Community Based Disaster Risk Management
CCCCC	Caribbean Community Commission on Climate Change
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CDEMA	Caribbean Disaster Emergency Management Agency
CDERA	Caribbean Disaster Emergency Response Agency (now CDEMA)
CDM	Comprehensive Disaster Management
CDRT	Community Disaster Response Team
CIDA	Canadian International Development Agency
CIMH	Caribbean Institute of Hydrology and Meteorology
CRED	Centre for Research on the Epidemiology of Disasters
CSO	Civil Society Organisations
CUBIC	Caribbean Uniform Building Code
DfID	Department for International Development
DIPECHO	Disaster Preparedness programme of The Humanitarian Aid Department of the European Commission
DRR	Disaster Risk Reduction
EC	East Caribbean
ECLAC	Economic Commission for Latin America and the Caribbean
EEZ	Economic Exclusion Zone
ESCAP	Economic and Social Commission for Asia and the Pacific
ESDU	Environment and Sustainable Development Unit
FIU	Florida International University
GDP	Gross Domestic Product
GEF	Global Environment Facility

GFDRR	Global Forum for Disaster Risk Reduction
GRENCODA	Grenada Community Development Agency
HFA	Hyogo Framework for Action
ICUN	International Union for the Conservation of Nature
IDNDR	International Decade for Natural Disaster Reduction
IEG	Independent Evaluation Group
IRIN	Integrated Regional Information Network
ISDR	International Strategy for Disaster Reduction
JICA	Japanese International Cooperation Agency
LAC	Latin American and the Caribbean
LIC	Layou Improvement Committee
MDG	Millennium Development Goals
MoSSiaC	Management of Slope Stability in Communities
NaDMA	National Disaster Management Agency
NaDMAC	National Disaster Management Advisory Council
NEAC	National Emergency Advisory Council
NEMAC	National Emergency Management Advisory Council
NEMO	National Emergency Management Organisation
NEPO	National Emergency Planning Organisation
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
OECS	Organisation of Eastern Caribbean States
OFDA	Office of Foreign Disaster Assistance
PAHO	Pan American Health Organisation
PCDPPP	Pan Caribbean Disaster Preparedness and Prevention Project
RGS	Royal Geographical Society
RSS	Regional Security System
SAARC	South Asian Association for Regional Cooperation
SEDU	Sustainable Economic Development Unit
SIDS	Small Island Developing States
SRC	Seismic Research Centre
SVG	St Vincent and the Grenadines
SVGCF	St Vincent and the Grenadines Cadet Force
TAC	Technical Action Committee
UN	United Nations

UNCED	United Nations Conference on Environment and Development
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organisation
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNESCO	United Nations Educational Scientific and Cultural Organisations
UNFCCC	United Nations Framework Convention on Climate Change
UN-Habitat	United Nations Human Settlements Programme
UNIFEM	United Nations Development Fund for Women
UNISDR	United Nations International Strategy for Disaster Reduction
UN-OHRILLS	United Nations High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States
USAID	United States Agency for International Development
UWI	University of the West Indies
UWICED	University of the West Indies Centre for Environment and Development
WB	World Bank
WCDR	World Conference of Disaster Reduction
WHO	World Health Organisation
WSSD	World Summit on Sustainable Development

CHAPTER ONE

"The message is clear: Disaster risk reduction should be an everyday concern for everybody. Let us all invest today for a safer tomorrow"
(Ban, 2011, p.1).

1 Introduction

1.1 Background to the Study

Small Islands Developing States (SIDS) are highly vulnerable and their location and geological formation means they are at risk to multiple hazards. The Caribbean has the largest number of SIDS, which includes the Windward Islands, a subgroup within the Caribbean region. These islands are prone to multiple hazards such as volcanic eruption, hurricanes, landslides, flooding and earthquakes (O'Keefe and Conway, 1977, Global Facility for Disaster Risk Reduction (GFDRR), 2010). The devastation caused by hazards is often high because of the volcanic nature and mountainous topography of the Windward Islands with their limited flat lands for development. This has led to the reclamation of lagoons, coastal areas and other high-risk areas to construct critical facilities.

The impacts of hazards on high-risk areas usually occur in small increments, but the effects accumulate over time. Small-scale and localised hazard impacts do not usually meet the criteria of global databases to be categorised as disasters. Consequently the proportional impact of disasters is greater for small islands states as opposed to large states. This proportionality includes both the large scale impact of a single event as well as the incremental impact of a number of small events over a period. The impacts of small events are long term and can be detrimental to development and livelihoods in small islands (Lewis, 1999). The impacts range from the destruction of homes and other infrastructure, agricultural losses, damage to road networks, transportation and communication systems, livelihood disruption and economic stagnation (O'Keefe and Conway, 1977). Damage to the environment includes loss of topsoil and beach erosion. Loss of topsoil can adversely affect the yields of farming communities. Beach erosion can

undermine the tourism sector. Uribe et al. (1999) noted that small and medium size events in the Latin America and Caribbean region add up to more damage and disruption annually. However one large scale event can destroy the single facility on a small island state such as a university, airport, port or hospital which is a hundred per cent loss since it may be the only one, whereas in developed countries such as the USA when there is a loss of one out of hundreds of universities, the proportional impact is not as significant (Anderson, 2001).

Some of the most damaging events in the Windward Islands include; the 1994 impact of Tropical Storm Debbie, which caused floods and landslides in Saint Lucia, affecting 75 per cent of the water supply on the Island. In 1995, three hurricanes, Iris, Luis and Marilyn affected Dominica over a three-week period resulting in 98 per cent damage to crops and a 2 per cent deficit in economic growth (Benson and Twigg, 2007). Hurricane Omar 2008 caused over 5 million East Caribbean (EC) dollars worth of damage in St Vincent and the Grenadines (National Emergency Management Organisation, 2008) and a fire in Conway, Saint Lucia in 2004 cost an estimated 450,000 EC dollars (French, 2004). Such events are often unreported in international news or recoded in disaster databases, but they do hamper development in small island nations.

There are also the higher scale events, such as hurricane Tomas 2010, a Category one storm that caused considerable damage in Saint Lucia and St Vincent and the Grenadines. According to CDEMA (2010) about 90 per cent of the banana crop was damaged in Saint Lucia, leading to a weekly loss of about 2.0 million EC dollars over the subsequent six months. This increases the vulnerability of small farmers and other workers who depend on this weekly income to meet their basic needs. Such destructive events have an immediate and lasting impact on small Islands as funds earmarked for development are diverted to provide relief, clean-up operations and rebuilding lives and infrastructures. A once-in-every five year disaster requires 10 to 15 years or longer for the recovery of infrastructure and can be even longer and more lasting for social impacts (Springer, Gibbons and Paeniu, 2002). What this means is that even during the recovery process islands are likely to be impacted by other hazard events while addressing daily social issues. Investing in long term risk reduction

measures is critical to build resilience so that the same people and sectors are not continuously being affected.

Disaster management systems in the Caribbean region were initially established to prepare for and response to hazard impacts. Response was generally haphazard and reactive and often lacked any effective preparation. Over the years, there have been changes in how the region deals with hazards, including the expansion of national disaster management frameworks, mandate and operation of disaster management organisations. The Islands work with various national, regional and international partners and develop their respective protocols and policies. However they are working towards similar goals of comprehensive disaster management through the Caribbean regional framework.

As highlighted by the GFDRR (2010) there is still too much focus on preparedness and response, and too little focus on risk reduction. The community focus is also on disaster preparedness and very little is done on reducing vulnerability and building community resilience. The majority of national resources are used to either repair or reconstruct damaged infrastructure. Insufficient attention is given to developing, implementing, monitoring and enforcing good practices and standards. Community programmes do exist, but many fail to address the real issues affecting communities and many of the programmes aimed at disaster risk reduction do not contribute to the overall sustainability of the islands.

Data on the effects of disasters on national vulnerability is limited and often either unavailable or not used to inform policy and other decision-making processes in SIDS (Springer, Gibbons and Paeniu, 2002). Therefore, measures to reduce vulnerability are slow to be developed and implemented. Carby et al. (2011) noted that many islands in the Caribbean region have done vulnerability mapping for a range of hazards, but they do not all have the technical and technological capacity to make best use of these maps. In addition, some maps were made a long time ago and need updating. The gaps arise because government agencies, NGOs, community groups and other stakeholders often work in isolation. In addition, programmes and activities are not always informed by community needs. The most vulnerable people are often marginalised and various organisations duplicate

programmes in the same communities, which can isolate other parts of a community.

A community participatory agenda is promoted as opposed to a top down, command and control approach. However, most community members are not active participants in planning and decision-making in their communities. Community members are incorporated in training or towards the end of projects, but are often left out of the conceptualisation stage. Community participatory approaches should empower communities to identify and reduce their own risk, which should help community development and resilience building.

1.2 Rationale

The Anglophone Windward Islands have some disaster management capacity as discussed earlier and in Chapter 4. These include the setting up of national disaster management framework, some level of disaster management legislation, building codes, although there is need for additional legislation and enforcement where legislations already exist. Challenges exists in disaster management in terms of human and financial resources more so in Dominica and St Lucia with less than 10 total staff and a few more in Grenada and St Vincent and the Grenadines but with a general lack in the technical capacity of most staff members.

Challenges noted by (GFDRR, 2010) included outdated national disaster plans which are used to guide the operations of National Disaster Management. In terms of the 4 islands only St Lucia has an updated and comprehensive plan while the other islands disaster management plans date back to 2005 and 2006. Other challenges noted included the focus on preparedness and response activities with very little focus on vulnerability reduction. In all four islands there is still the need for the integration of DRM into development policy which is lacking in Dominica and is a bit more advanced in Saint Lucia than Grenada and St Vincent and the Grenadines (GFDRR, 2010).

National disaster agencies also lack the capacity to focus on building both community and national capacity. This means that the agencies have to prioritise. Disaster agencies focus on generic training, island wide vulnerability assessments, key sector assessments and national disaster management capabilities. The limited staffing of the disaster offices does not allow much support for community risk reduction. Many small states are dependent on civil society organisations to support disaster risk reduction at the community level. Civil Society Organisations (CSOs) with their broad mandates are also constrained and do not always have the capacity to be effective in community risk reduction. However, building the capacity of CSOs can help to reduce the burden on national government for community risk reduction. This however, does not remove overall responsibility from the government to ensure that there is an enabling environment for DRR. An enabling environment includes policy, legislation and a platform to facilitate risk reduction processes.

1.3 Personal and Professional Experience

A number of factors influenced the decision to undertake this research on DRR in the Windward Islands. The researcher has considerable experience in disaster management in the Windward Islands. The researcher has been a volunteer for national emergencies for over 20 years as a member of the St Vincent and the Grenadines Cadet Force (SVGCF). The researcher has also been involved in education and taught geography in the secondary school system. The researcher completed a disaster management course at undergraduate level and then completed an MSc in Disaster Management. The MSc thesis focussed on perceptions of hurricane risk and risk reduction strategies in the Windward Islands. Before commencing the PhD programme, the researcher was employed by the National Emergency Management Office (NEMO) in St Vincent and the Grenadines.

The Cadet Force a youth based, paramilitary organisation has a mandate that includes assisting in any national emergencies. The Cadet Force, for example, was instrumental in the evacuation of people during the 1979 eruption of La

Soufrière, as well as the management of evacuation shelters. In 2004, when Hurricane Ivan devastated Grenada, cadets assisted with the collection, packing and transportation of supplies to Grenada on two occasions. This involvement gave the researcher first-hand experience of the devastation the hurricane had on infrastructure and people's lives. Most of the buildings that could be seen when approaching the island had lost their roofs and almost all the vegetation had been stripped bare. There was the sense that people just wanted to get on with their lives and forget that the disaster had actually happened. People were in the port and on nearby roads, seeking basic supplies, particularly drinking water and tarpaulin to cover the roof of their homes.

The MSc thesis explored the perception of hurricane risk held by community members and decision makers in the Windward Islands. The researcher worked with two communities in St Vincent, as well as with regional decision makers to get their views on hurricane risk and risk reduction strategies. The research concluded that perceptions play a role in the decisions people make in relation to risks. The study also confirmed that lay-people perceptions are generally different to those at the policy decision level (Ferdinand, 2006). This research will build on the research work done at the MSc level but with a broader focus on the Windward Islands and for the benefit of SIDS elsewhere.

The researcher worked at the "disaster office", which meant working closely with the regional mechanism, the Caribbean Disaster Management Agency (CDEMA) under a revised Comprehensive Disaster Management (CDM) Framework. The Caribbean CDM is discussed in Chapter 4. This post required working closely with a number of regional and international organisations, which, at times, was quite challenging. Duties included writing reports, attending meetings, planning and collaborating with these agencies while attending to the needs of communities within the national disaster management agenda. The National Emergency Management Office (NEMO) collaborated with about 40 community organisations and committees, which were either specifically set up for disaster management or had adopted disaster management as part of their mandate. Notably, there are only a few NGOs operating in the Windward Islands. The main organisations involved in community disaster management in St Vincent and the Grenadines

(SVG) are listed in Appendix 1. The organisations are involved in planning activities within the community aimed at disaster preparedness and supporting the national disaster management programme.

During consultations with some community organisations, they found their role of working with the community demanding, especially because of a lack of dedicated resources to support their activities. In working with the disaster committees, the most satisfying aspect of the researcher's role was being able to gather their views first hand while making small, but worthwhile, progress. The community disaster programme included training in damage assessment, family disaster preparedness, grant and proposal writing and developing community disaster plans. Despite high levels of satisfaction, it was a huge undertaking for a small and inexperienced staff to collaborate with so many organisations, in addition to their other responsibilities. Some organisations were of the view that they did not receive the level of support they needed from the National Emergency Management office (NEMO).

The concerns that were raised led the researcher to examine the disaster literature. The literature clearly indicated that many people, especially the poor, are vulnerable to the impact of hazards. It is also evident that there are many organisations and community based initiatives in the field of disaster management. The literature also highlighted many effective good practices as well as lessons learnt on disaster risk reduction at the community level.

It is apparent that for community programmes to be effective, collaboration among stakeholders is essential. In addition, community programmes need to be integrated into the community with residents as active participants. Finally, community programmes should bring about change in behaviour. As such, this research seeks to translate words into actions to reduce vulnerability and enhance resilience. Hence, this research benefits from engaging different stakeholders to achieve the aim and objectives and the approach undertaken throughout this thesis.

1.4 Aim and Objectives of this Research

The overall aim of this research is to examine the vulnerability and capacity of communities to hazards in the Anglophone Windward Islands and develop strategies to reduce risk and build community resilience. To achieve the aim the following objectives were addressed:-

- An investigation of the factors affecting vulnerability to hazards in the Windward Islands.

- Identification of existing capacity in reducing risk and building resilience to hazards in the Windward Islands.

- An analysis of the effectiveness of community programmes in reducing risks to hazards in the Windward Islands.

1.5 Contribution to Knowledge and Practice

A review of the progress of SIDS in the Caribbean in implementing the HFA concluded that research capacity within the Caribbean region in relation to DRR is weak. It is not claimed that this research will address that weakness, but it will contribute to improving the research capacity in the Caribbean region.

Initial research by the author shows that DRR is generally top-down with community voices often distanced from the process, particularly in small islands. This PhD thesis will make an original contribution to knowledge and practice by developing mechanisms to assist vulnerable communities to identify their needs and develop solutions. The research is also an opportunity to share information with NGOs and other stakeholders interested in contributing to building community resilience.

Communities in SIDS, such as the Caribbean, are exposed to many hazards that often overwhelm entire islands and communities. Many of the existing studies highlight the vulnerabilities of SIDS in Latin America and the Caribbean (LAC) as a

region. Many Caribbean Islands are small and the proportional impact of a hazard on an entire island can be greater than a large city in Latin America. Therefore the aggregation of the LAC region as a whole can reflect general trends and this does not highlight or address the needs of smaller island states and communities. This tends to marginalize the real issues within individual, smaller, less influential island states

This research will therefore contribute to theories related to hazards, vulnerability, and risk reduction, especially in relation to communities in the Anglophone Windward Islands. The data gathered in the Windward Islands in this study, will help to develop the knowledge capacity of key agencies that lack the resources to conduct such vital research on communities. The research seeks to influence decision making in the design of community programmes and policies aimed at sustainable development. This will ensure that community based programmes are congruent with the needs of the community and focus on building community resilience and reducing disaster risks.

This study will identify good practices in other communities that can guide the approach to community-led participatory programmes. The researcher will return to the Windward Islands after completing the PhD programmes and plans to continue working in the disaster management field. The researcher is of the view that this research will contribute to the development of effective DRR practices in the Anglophone Windward Islands.

1.6 Outline of Chapters

Chapter 2 examines disaster risk reduction and related concepts and asks if they can be integrated into community development. To address disaster risk it is critical to understand changing trends. The chapter critically analyses how the focus of disaster management has shifted from addressing hazards to a focus on the vulnerability of people and places. The literature also acknowledges that in every community there is capacity that can be developed to reduce risks and build community resilience. Community DRR, however, requires multi-stakeholder

partnership with the community at the centre and support from government, civil society organisations and the private sector.

Chapter 3 describes the philosophical and methodological approach used in this thesis. The approach is based on a mixed methods strategy, which is best suited to complex topics, such as disaster risk reduction. The chapter further outlines the qualitative and quantitative methods used in the data collection. Ethical issues and limitations of the research are also explained in this chapter.

Chapter 4 places the Windward Islands within the context of Small Islands Developing States and their inherent vulnerability that hinders their progress towards achieving sustainable development goals. The chapter then gives an overview of the selected Windward Islands and the challenges and progress made in relation to disaster risk reduction. This includes the development of disaster management mechanisms at the national and local levels and collaboration at the regional and international levels. A synopsis of the fieldwork sites and the local structures is also given.

Chapter 5 presents the empirical findings of the qualitative and quantitative data collection undertaken on each island. The chapter focuses on the exposure to hazards and the socio-economic conditions that contribute to vulnerability to disasters. This includes the main hazards that have affected the islands between 1911 and 2011 and the impact on different sectors. The chapter also includes a discussion on the vulnerability of people and livelihoods which are susceptible to harm.

Chapter 6 presents the results gathered from the key informants of organisations and the government sector. The focus is on some of the programmes and projects that are aimed at promoting community development and disaster risk reduction. The chapter focuses on the effectiveness of the programmes and the challenges faced in implementing them. Reference is also made to open-ended questions administered to household participants on their involvement in organisations and their knowledge of community systems in place to support disaster management.

Chapter 7 is a discussion of the main findings from chapters 5, and 6 on the key components of DRR and the context of SIDS in Chapters 2 and 4. The chapter discusses the physical, as well as the socio-economic vulnerability of the Windward Islands. The key social factor which contributes to the vulnerability of the Windward Islands is poverty. This is a cross-cutting theme in terms of livelihoods, housing, access to resources and educational achievement. The chapter also highlights the vulnerability of certain groups, such as the elderly and disabled, who are usually not included in disaster planning. The chapter further pinpoints the importance of community cohesion and bonding which helps people to cope with adverse events. The close connections in communities can also prevent people from embracing DRR efforts, especially if they are pushed by external agencies. People cope with disasters, but they are not building resilience to withstand future hazards.

Chapter 8 is the conclusion of the main research findings and a synopsis of how the research objectives were achieved. This chapter also makes propositions on how the research will contribute to building a culture of safety through the implementation of more effective DRR in communities. The chapter further suggests gaps that future research can address.

1.7 Conclusion

This chapter introduced the main insights derived from this research and provided a brief summary of the remaining eight chapters that make up this thesis. The next chapter presents a conceptual framework of the main theories underpinning this research.

CHAPTER TWO

"It is only when man seeks to wrest from nature that which he perceives as useful to him that he is strongly challenged by the vagaries of natural phenomena acting over and above the usual uncertainties of economic activity"
(Burton and Kates, 1964, p.214).

2 Conceptual Framework

2.1 Introduction

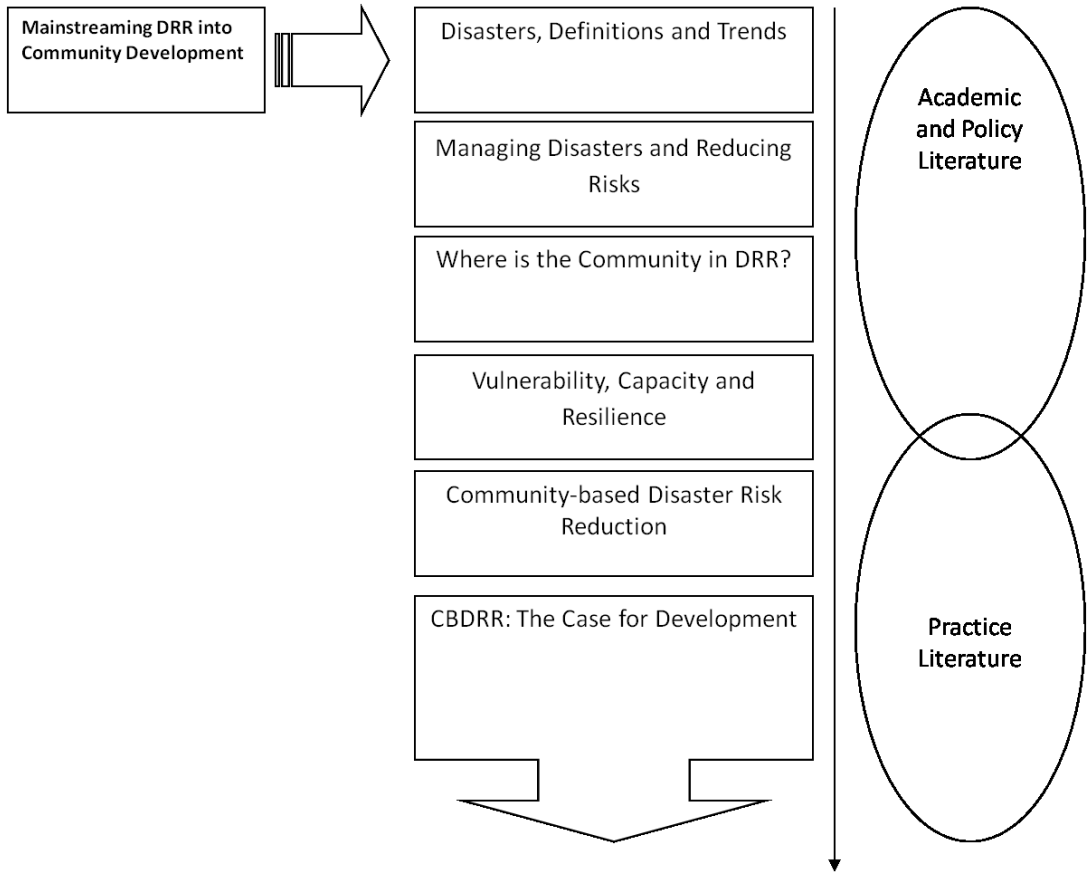
This chapter presents a conceptual framework of the key concepts underpinning this research on disaster risk reduction in communities. Disaster Risk Reduction (DRR) is a global priority outcome essential to the achievement of sustainable development goals. Implementing effective DRR has proven challenging, especially for Small Island Developing States, such as those in the Caribbean. This chapter explores the main trends in disaster data as a necessary means to understand disaster risks.

The chapter then critically analyses the shift in the hazard paradigm to a people focus as it relates to their vulnerability. Vulnerability is a core concept in this research, which helps to explain how and why people make decisions about hazards and the context in which they are obliged to make them. Knowledge of existing capacities in a society helps to determine what capacities will be required to achieve common goals. These concepts are addressed within the framework of households, communities and institutions.

This discourse also examines communities in relation to networks and factors that contribute to vulnerability, capacity and resilience. The chapter concludes with a conceptual framework diagram, which illustrates the ideal linkage between the main components and stakeholders in community DRR.

Figure 2.1, sets out the key sections in this chapter. The literature review analyses academic, policy and practice literature that has informed disaster studies in the past and up to present.

Figure 2.1: The Literature Review Process



Source: Author

2.2 Disasters, Definitions and Trends

Arguments surrounding the definition of disasters have been widely debated and captured by Quarantelli (1998), in the first edition of 'What is a disaster: Perspectives on the Question'. It encapsulates disasters as a matter of perception, definitions based on organisational agendas, cultures and discipline. However, the debate seemed to have generated more questions than answers such as which approach to use in defining the concept and whether a disaster is internal or external to the community. Another question surrounds the characteristics of the community and whether or not they play a role in how a disaster is defined. The second edition 'What is a disaster: New Answers to Old

Questions' is even more perplexing as the discussion is influenced significantly by globalisation as well as new and emerging threats. Such threats include climate change and terrorist events such as the 911 bombing of the World Trade Centre. A disaster is not easy to define and will continue to be widely debated and influenced by changes taking place in our societies.

UN/ISDR (2009b, p. 9) defines a disaster as:-

> *A serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts, which exceeds the ability of affected community or society to cope using its own resources.*

There is also the notion of disasters as a natural phenomenon, which researchers have long tried to dispel (O'Keefe, Westgate and Wisner, 1976; Schilderman, 2004; Kelman, 2010). Natural disasters are rarely natural ‘‘ their causes are complex, often attributable to a combination of socio-economic factors that modulate, for better or worse, the impact of environmental hazards on human systems" (Tompkins, Lemos and Boyd, 2008, p. 736). The concept of natural disasters give a false impression that people do not interact or have control over what is actually the relationship between natural systems with human interventions. The World Bank (2010) has endorsed the discourse in the report "Natural Hazards, Unnatural Disasters". This view highlights the concerns of the increasing cost of disasters and destruction of lives, livelihoods and properties. The focus of reducing disaster risks should be on the changing nature of hazards, the influence of climate change, sprawling cities and the increasing vulnerability of the world's poor, which exacerbate disasters

Disasters are a global concern and there is the tendency to apply global solutions (Lewis, 1999). However, global solutions are not always suitable to solve local problems. Reducing risk to disasters should be put in context of place and time to increase the effectiveness of risk reduction strategies. The lack of effective risk reduction strategies can be attributed to the uncertainty in disaster related trends. Understanding disaster statistics and trends is of paramount importance to research on reducing disaster risks. "Systematic disaster data collection and

analysis can be used to inform policy decisions to help reduce disaster risk and build resilience" (UNISDR, 2012, no page).

There are concerns that the probabilities of disasters occurring are increasing and there is a corresponding increase in the loss and cost of disasters, but, in general, there is a decrease in disaster-associated deaths. Losses associated with disasters between 1990 and 1999 are estimated to be 15 times greater than the period from 1950 to 1959 (IEG, 2006). Annual losses have ranged from an average of US $75.5 billion in the 1960s, US$ 138.4 billion in the 1970s, US$ 213.9 billion in the 1980s and US$ 659.9 billion in the 1990s (UNDP/BCPR, 2004). Conversely, the number of people who died from natural disasters has decreased from 2 million in the 1970s to 800, 000 in the 1990s, but the number of people affected has tripled (IRIN, 2005). Yodmani (2001, p. 2) argues, "Over the four decades from 1960s to the 1990s, there has been an exponential increase in human and material losses from disaster events, though there was no clear evidence that the frequency of extreme hazard events has increased". Data collated by CRED contradicts Yodmani, as it shows that while disasters have increased in numbers, the number of fatalities has fallen while the costs of disasters have risen.

The decade of the 2000's proved gloomier and more challenging than that of the 1990's. "Global summaries for 2002 report the occurrence of more than 500 disasters, with more than 10,000 people killed, 600 million people affected, $55 billion in total damage and US$13 billion in insured losses" (United Nations, 2003, p. 2). CRED (2012) reported that in 2011 alone there were 392 natural disasters globally, causing over 29,000 deaths and affecting over 200 million people. In addition, economic damage amounted to over US$ 366 billion. The increase in disaster losses have been attributed to factors such as better reporting and an increase of population in hazardous areas (Burton, Kates and White, 1993). Though the trends that CRED have identified appear clear, there are examples of years where major events such as the 2004 tsunami, the Haiti earthquake in 2010 and Japan 2011 earthquake and tsunami have produced death rates that are outside of this trend.

Underpinning the trend of increased disaster loss and cost are factors such as, population growth, increasing urbanisation, widespread infrastructural development and an increase in the frequency and severity of meteorological events driven by accelerated climate change. The global population is expected to reach some 9 billion by 2050. At present about 50 per cent of the global population, live in urban areas (United Nations Human Settlements Programme (UN-Habitat), 2010). This proportion is likely to grow and is likely to expose more people to the effects of climate change.

There is evidence which shows that meteorological events have increased in both frequency and severity between 1951 and 1980. Between 1951 and 1980, these events affected between 0.1 and 0.2 per cent of the world's land surface each year. Now, on average, meteorological events affect about 10 per cent of world's land surface. Research suggests it is highly likely that increased variability in the climate system, driven by increased greenhouse gas emissions from human activities, is responsible for these extremes. Both the droughts in the Sahel and the US crop failures are likely to be the result of climate change (Hansen, Sato and Ruedy, 2012).

Further research showing a link between Arctic Amplification (AA) and extreme weather events in the mid-latitudes corroborates Hansen, Sato and Ruedy (2012). During the last few decades, the Arctic has warmed at twice the rate compared to the rest of the northern hemisphere. The loss of Arctic sea ice allows the exposed seawater to absorb more of the Sun's energy during the summer and this is released as the sea begins to freeze during the autumn. In addition, the research suggests that warmer air over high latitude land results in earlier snowmelt and the drying of land. Both of these occurrences contribute to conditions that can lead to extreme weather conditions, such as prolonged drought, flooding, heat waves and cold spells in the mid-latitudes of the northern hemisphere (Francis and Vavrus, 2012).

Many cities and urban areas are located on rivers, in estuaries and coastal areas exposed to these extreme conditions. This makes them vulnerable to storms, storm surges and floods. Recent events have shown that cities are also

vulnerable to landslides following intense precipitation events, such as in Seoul in the Republic of Korea in 2011. In the UK, Morpeth was flooded when the river Wansbeck broke its banks. Both meteorological and geophysical events will continue to threaten many cities but the impact will be proportionally greater in small island states as discussed in details in Chapter 4.

Cities are developing at such a pace that development does not always take into account future threats. This lapse in judgement, coupled with increasing urban poverty, means that many urban communities will become increasingly vulnerable. It is clear that the impact of natural hazards will continue to increase as long as urban poverty is not addressed. Failure to address poverty will mean that many poor people will become increasingly vulnerable (Schilderman, 2004). As discussed later in this chapter, vulnerability and poverty are not the same, but they are related. The outcomes from international disaster conferences held since 1992 have pinpointed poverty as an underlying cause of disasters. Disasters therefore can be seen as the inability to manage hazards and reduce disaster risks.

2.3 Managing Disasters and Reducing Risks

Alexander (1993) identifies six approaches to disaster research (geographical, anthropological, sociological, developmental, medical and technical) but the most dominant disciplines, particularly after the Second World War, are geography and sociology (Alexander, 1993). In the geographical approach the focus is on human-environment interactions, while the sociological approach considers disasters as social events that reflect the ways we live and structure our societies and communities. The sociological research led by Dynes and Quarantelli generally addresses the problem of response to an analysis of collective organisational behaviour (Dynes, 1970; Quarantelli, 1984). Critics of the sociological school note that its focus on organisation is primarily to improve the command and control system in response mode. In general, this approach has been adopted in developed countries (Drabek, 1986). Developing countries tend to take a more

collaborative approach involving a combination of international, national and community organisations.

In geography, the natural hazard paradigm that was led initially by Gilbert White at the University of Chicago in the late 1950s and early 1960s, focussed on water resources, particularly flooding and other natural hazards (White, 1945; Burton, Kates and White, 1978). However, the natural hazards paradigm has been criticised as having too much of an emphasis on the individual cause of disaster, for example fire, earthquake and flood (Quarantelli, 1992).

Smith (1984) brought together the physical and social worlds through his commentary on uneven development that linked modes of production to the production of nature and, thus, space. Essentially this means as we develop, for example, as we shifted from hunter-gatherers to agriculturists, people would begin to produce new forms of nature. Tools fashioned from natural materials would be used to clear land for planting, as well as the construction of shelters. This would produce a nature that, through human intervention, would supply a livelihood. Simultaneously, this would produce new spaces, such as fields and shelters, where human activities would take place to both produce resources, such as crops, and places where produced resources would be processed for human consumption. This does not imply mastery of nature, but use of nature to meet human needs and desires (Smith, 1984). The over-exploitation of nature can result in challenges as suggested in the quote by Burton and Kates (1964) at the beginning of this chapter.

The quest to fulfil human needs has led to ecologically destructive practices, which exposes people to harm. This includes practices such as deforestation, filling in wetlands, reclamation of coastal lands and engineering rivers (Abramovitz, 1999). In such altered environments, natural events, such as storms, are likely to result in disasters, which are seemingly natural. It is therefore up to people to devise measures for reducing their risk to such events. O'Brien et al. (2010) argue that development of all kinds produce new risks. In short, their view is that risk is part of the daily process.

There was criticism of the natural hazard paradigm by Smith and O'Keefe (1980; 1985). They argued that such an approach illustrated the poverty of the hazard research school, namely that it assumed nature is separated from human activity; that nature is seen as natural and only hazardous when it intersects with human activity and humans are assumed to be absorbed by nature. The criticism built on earlier work by O'Keefe and Westgate (1976) that highlighted the importance of understanding social vulnerability, which implied changing levels of risk in changing conditions of political economy. Further criticism of the hazards paradigm emerged in the 1980s, fuelled by the globalising tendency of the hazards paradigm, which demanded a more progressive people focused approach to disaster planning (Hewitt, 1983).

Criticising the hazard paradigm does not denigrate the relevance of scientific research of hazards, but underscores the importance of a parallel focus on the issues that render people and places vulnerable. Taken together, this people focus suggests that there are new ways of learning about disaster management. This people focus is paralleled by support at the global level. The 1990s were declared the International Decade for Natural Disaster Reduction (IDNDR). This declaration was fuelled by the escalating cost of disasters in the 1980's.

The 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro agreed five broad areas for making progress towards sustainable development (United Nations, 1992). Heads of State or Government representatives from almost 200 countries adopted three major agreements that were aimed at changing the traditional hazard approach to a development centred approach. The three major agreements included:-

- Agenda 21, a global comprehensive plan of action to promote sustainable development;

- The Rio Declaration on Environment and Development; guiding principles on the rights and responsibilities of States;

- The Statement of Forest Principles, aimed at sustainable forest management worldwide.

The other two areas of agreement were legally binding conventions; “the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity” (United Nations, 1992). The overall aim of Agenda 21 and the Rio principles was to get a commitment from nations to promote sustainable development by focussing not just on the natural environment but, most importantly, on economic and social development. While there were some successes, concerns were expressed about the low level of progress made since UNCED in 1992. The Inter-Parliamentary Union (1997) reported that results obtained since UNCED 1992 with regard to the achievement of sustainable development, were very poor. Further, they reported that the situation had worsened in several fields, such as the depletion of natural resources, world-wide pollution, the food crisis and destabilisation of societies.

The main guiding principle of the IDNDR was the “Yokohama Strategy for a safer world” which derived from the World Conference on Natural Disaster Reduction held in Yokohama, Japan in 1994. The aim of the strategy was to promote prevention, preparedness and mitigation of disaster risks (UNISDR, 2005).

In December 1999, the United Nations International Strategy for Disaster Reduction (UNISDR) was created and became the United Nation's office for disaster risk reduction and the secretariat of the International Strategy for Disaster Reduction. It is the successor to the secretariat of the IDNDR, with the purpose of spearheading the implementation of the International Strategy for Disaster Reduction.

The mandate of UNISDR expanded in 2001 to serve as the focal point in the UN system for the coordination of disaster reduction and to ensure synergies among the disaster reduction activities of the UN system and regional organisations and activities in socio-economic and humanitarian fields. The vision of the UNISDR is based on the three strategic goals of the Hyogo Framework for Action (HFA): integrating DRR into sustainable development policies and planning; developing

and strengthening institutions, mechanisms and capacities to build resilience to hazards and incorporating risk reduction approaches into emergency preparedness, response and recovery programmes (UNISDR, 2005). Emerging from these developments is an approach to disaster management that focuses on vulnerability. This approach accepts that hazards will occur, but the level of vulnerability determines the degree of risk at all levels (individual, community, institutional and national). Disaster risk reduction entails the use of both structural and non-structural measures to reduce vulnerability and consequently enhance resilience.

The UN, working in collaboration with many countries and organisations, remains the driving force on human and environmental issues. The World Conference on Disaster Reduction (WCDR) held in Kobe, Japan in 2005 was a renewed effort to promote disaster risk reduction as a necessity for overall development. The meeting adopted the Hyogo Framework for Action (HFA) 2005 to 2015 with the theme “Building the Resilience for Nations and Communities to Disasters” (UNISDR, 2009a). At the regional level, the then Caribbean Disaster Emergency Response Agency (CDERA) reviewed and enhanced the 2001 Caribbean Comprehensive Disaster (CDM) strategy and framework. The enhanced CDM approach also reinforced the need to focus on community capacity to reduce disasters; this is discussed in more detail in Chapter 4. Focusing on the community is considered to be a vital part of implementing the HFA and achieving sustainable development goals (Action Aid/Royal Geographical Society (RGS), 2006).

2.4 The Community in Disaster Risk Reduction

Disaster Risk Reduction (DRR) is defined as:-

> *The concept and practice of reducing disaster risk through systematic efforts to analyse and manage the casual factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events* (UNISDR, 2009b, p.10).

Implementing disaster risk reduction contributes towards the broader goal of sustainable development. As such "addressing disaster reduction in this broad context requires a collaborative approach, involving different and diverse sectors and organisations where managing risk is seen as everyone's business" (Provention Consortium, 2007, p. 2). Good communication, coordination and awareness are considered as key assets of a community disaster risk reduction programme (Action Aid/Royal Geographical Society (RGS), 2006). Disaster risk reduction includes components such as disaster management, disaster prevention and mitigation and disaster preparedness. This requires action in all sectors of a society as well as support from national, regional and international stakeholders to make DRR a success. Many policy makers articulate the importance of DRR but very often, this does not materialise into worthwhile practical actions.

An effective means of implementing disaster risk reduction is by focusing disaster risk reduction at the community level. This view is supported by international HFA and Regional Caribbean CDM strategies DRR as discussed in the previous section. UNISDR (2008, p.14) affirmed that "Communities are always the true 'first responders' in emergencies, so it is critical to build their capacity at a local level in addition to supporting DRR networks at the national level". Community involvement in disasters usually takes various forms. Community members provide first aid, food, shelter and care, search and rescue, damage assessment and reconstruction.

Community members know where the weak and strong structures are located in the community, they also know the vulnerable people and where they live. Community members are usually well able to provide good information for damage assessments after a disaster. In two instances the community disaster teams in affected communities organised themselves and assisted others prior to the arrival of outside assistance. This includes the activities of the disaster team following hurricane Tomas 2010 when Soufrière, Saint Lucia was cut off from the rest of the island for several days by landslides (CDEMA, 2010). In St Vincent and the Grenadines, a low-level trough in April 2011 resulted in torrential rain in the

Southern Caribbean that undermined a number of bridges leaving several communities inaccessible (CDEMA, 2011).

Two communities exposed to the same hazard can suffer different fates. The differences can be expressed by the level of preparedness and the capacity of the community to prepare, respond, cope and recover with limited losses. The type of mechanisms and resources available to a community can help to determine the level of organisation they can make for hazards. While communities differ internally and externally, shared experiences and support can help to achieve disaster risk reduction.

Marsh and Buckle (2001) note that there may be people in some communities who do not know or talk to each other and may not wish to take part in community activities before an event occur. Despite that, research has confirmed that in SIDS there are usually close-knit communities with strong kinship networks, which can be beneficial to community resilience programmes (Kelman and West, 2009). Generally, in times of disaster, people are willing to help even when they do not know the people they are helping. Whether hazards occur while people are in their home community or any other community, having the skills and competencies they acquire through community programmes are useful. Further, community risk reduction is likely to benefit society as a whole as it is can contribute to sustainable development.

A real concern is the attitude and behaviour of people towards hazards. People do not usually think of hazards as a main priority because there are other immediate needs that grasp their attention. These include making mortgage payments, cost of health care and education and providing for their family (Buckle, Marsh and Smale, 2003). Their first thought is not preparing for hazards that may never occur as they prefer to make decisions when they know that a hazard is inevitable (Hellsloot and Ruitenberg, 2004). There are also a number of myths associated with how communities behave in relation to disasters including that people panic and are helpless, they engage in unacceptable behaviour, such as looting, and they are totally dependent on aid (Bankoff, 2001). This and other factors influence the way disaster management has been organised. “Historically,

communities were seen as passive entities whose involvement in emergency management was only as receivers of assistance when emergencies occurred" (Enders, 2001, p. 1). It was felt that people in the community were incapable of making decisions for themselves in emergencies, so decisions need to come from the "top down".

The much debated top-down approach was considered to be "characteristically technology-centred and driven by outside 'experts' " (Enders, 2001, p. 82). This view meant that communities were not usually involved in plans developed for use in their communities, even when some people in the community had specific responsibilities. This is especially true for nurses, police officers and teachers who are assigned to areas outside their usual place of residence. They may lack knowledge of the vulnerabilities within the community and this can compound the problem even further.

Each community is different in terms of hazard exposure, vulnerability, capacity and socio-cultural behaviour. These characteristics combine to determine the resilience of the community to shocks. Research has shown that communities are not completely helpless when faced with tragic events. "There exist a broad range of indigenous coping capabilities among the communities and in times of crisis, this is the most important means of survival prior to the arrival of humanitarian agencies" (Jegillos, 2003, p.12). Increasingly there is more research on communities, which focuses on a greater understanding of how people behave when faced with risky situations. Many communities pull together in emergencies and support each other better than expected. The realisation that people are not just helpless victims has led to changes in disaster management from a top down to a more bottom up, participatory approach. In the long term, neither a top down nor bottom up is the ideal approach but an integration of approaches is required for more effective results.

The focus on communities requires clarification of what is meant by a community as there is some "fuzziness" surrounding the definition of the term. Communities are complex and not united and there are a host of differences including wealth, social status and economic status, ethnicity, language, religion, social groups,

work, traditions, politics, gender and age, if by community we mean spatial location. In spite of that, engaging the community in planning and self-protection requires a clear and accurate sense of what is meant by community (Buckle, 1998). Dimensions of the community was addressed by Quarentelli and Dynes (1985) to include the community as belonging to and contributing to a social system in a particular place and the community as institutions or structures which have specific functions. This could include an ethnic group, a religious group or groups of various professionals.

Researchers such as Buckle, Marsh and Smale have widely addressed the concept of community as people who live in a relatively small area and share common characteristics and goals. Coles & Buckle (2004, p.7) reinforce this idea of community as "People at a local (that is sub-municipal) level who are not organised by emergency services but have skills, resources and an organisational capacity or structure that allows them to provide services to people at risk or actually affected by disasters". While there are differences in a community, that is, it is not a homogeneous unit, there are also common elements. Lorna (2003, p.271) refers to "a group of individuals and households living in the same location and having the same hazard exposure, who can share the same objectives and goals in disaster risk reduction". In relation to this study, community refers to a group of people residing in a particular location, exposed to similar risks and vulnerabilities. Developing their collective capacities will help to reduce their risk to hazards.

There are many organisations working in communities, either as disaster based organisations or other interest groups. They often highlight good practices for others to capitalise on and learn from. However, there are also many instances where organisations lack the drive to get communities to work together. This can lead to community fragmentation and failure of well-intentioned programmes that only reach certain communities and isolate others (Bankoff, 2001). The highly vulnerable groups are at the greatest risk and they include the old, disabled, sick, mentally and physically challenged, ethnic minorities (especially those who do not speak the main language) and specific groups of females and male who are isolated because of traditional cultural practices. Community Based Disaster

Management (CBDM) can be beneficial to communities, not just in relation to risk reduction, but more so in the overall development of the community. This process seeks to engage and encourage communities to develop or improve systems and procedures to prepare for, respond to and recover from disasters.

There are numerous case studies globally which highlight the effectiveness of community-based approaches to disaster risk reduction. The concept of Community Based Disaster Management is a means of building communities that are more resilient to hazards as discussed in more details in section 5.

2.5 Vulnerability, Capacity and Resilience

2.5.1 Addressing Vulnerability

The vulnerability debate has run for some time and spans a wide range of disciplines and issues, but there are commonalities when referring to people and places in relation to hazards. Vulnerability derives from the Latin word vulnerare (to be wounded) it conveyed the idea that people can be harmed both physically and psychologically. Vulnerability is often viewed as the opposite of resilience. Early researchers focused on the physical aspects of vulnerability such as hazards, buildings and structures. However, with the paradigm shift to the human influence on disasters the focus of vulnerability research has also shifted towards social vulnerability.

Vulnerability can be broadly defined in terms of susceptibility or the potential for loss or harm (Lewis, 1999; Cutter, 2001). The potential of being harmed is determined by a number of factors, which include how people perceive hazards, their knowledge of the phenomena and their corresponding behaviour using the available choices (Burton, Kates and White, 1993). The choices available to people may not always be the most accessible or affordable choices.
Loss can be expressed in terms of the exposure of people living in coastal locations or on marginal hill slopes that places them at greater risk to coastal hazards and slope failures. Hewitt (1997, p. 143) defines vulnerability as being: "...essentially about the human ecology of endangerment...and is embedded in the

social geography of settlements and lands uses, and the space of distribution of influence in communities and political organisation". The location of settlement and development in many island states is related to a number of factors which include land management and distribution, poverty and the history of colonialism, and settlement patterns. The relationship between poverty and vulnerability is discussed further in this chapter and colonialism and settlement pattern is discussed in Chapter 4.

Some research refers specifically to human vulnerability as it relates to exposure to natural hazards and the ability of people to cope, respond and recover from the impact of hazards (Dow, 1992; Clark et al.,1998). This depends on whether people are prepared to cope with the impact and, if affected, being able to manage or recover quickly with their own resources. O'Keefe and Westgate (1976) propose that it is people socio-economic conditions that cause disasters and not the natural phenomena. Research and understanding on the socioeconomic conditions which create vulnerability are critical in informing strategies to reduce risk to disasters.

Blaikie et al. (1994) identified some of the socio-economic characteristics as class, occupation, caste, ethnicity, gender, disability, health status, age, immigration status and social networks. Some groups of people have also been identified as likely to be more vulnerable such as the very young, very old, ethnic or religious groups and certain types of settlement (Lewis, 1999). The elderly and disabled are highly vulnerable in disasters because of their specific needs and their dependence on others for support (Morrow, 1999). Disaster management policies and programmes need to be developed to ensure that the needs of vulnerable groups are integrated into disaster management planning. Planning should include assessing vulnerable people and their needs, which can be included in community based disaster risk reduction plans.

Anderson and Woodrow (1998) relate vulnerability to access to physical, social, organisational and other assets. It is argued that vulnerability is as much a factor of physical exposure as it is the result of people's socio-economic conditions (Hewitt and Burton, 1971; Cutter, 1996). Cutter, Boruff and Shirley (2003)

recommend that an integrated approach should be used to determine the hazardousness of a place. The hazardousness is assessed by identifying both the physical and social factors that contribute to the vulnerability of the place. Cutter (1996) emphasises that it is also important to acknowledge that the vulnerability of a place is not static, but changes over time. In the same way, vulnerability assessments must also be a continuous process and not a one-off activity. Conducting such assessments gives an indication of what is needed to build capacity and reduce risks. Vulnerability is not just about people and places, but also about the institutions embedded in a society.

Institutional vulnerability has to do with the policies of government and the functions of public and private institutions. Their vulnerability is determined by the effectiveness of their policies and actions in mitigating risks, reducing vulnerability and recovering from disasters. Institutional vulnerability also refers to the ability of relevant organisations to respond to hazard events (Fordham et al., 2010). The lack of capacity to respond in a timely manner not only affects the organisations but those who are dependent on them. An institution that does not fulfil its responsibility for developing and enforcing policies is vulnerable and makes others vulnerable.

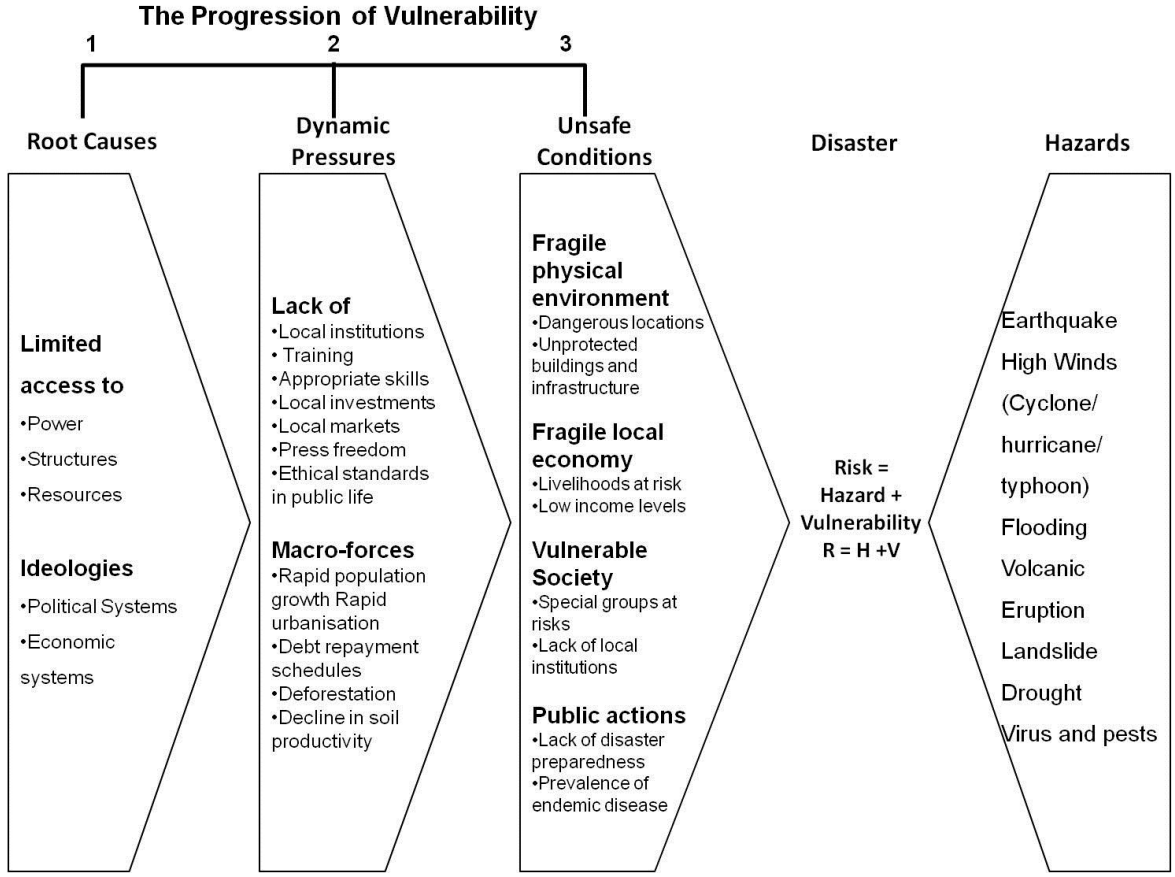
Strengthening institutional vulnerability to hazards includes developing and enforcing building codes, legislation, land use policies, urban planning and regulations. Fordham et al. (2010) noted that the effectiveness of an organisation to reduce risks to disasters depends on a number of key components. These include their capacity, their commitment, the type of institution, the length of existence and size of institution. There is no clear set of indicators to assess vulnerability as previously stated.

A range of factors can influence the vulnerability of a place; they can be external or internal in nature (Chambers, 1989; Lewis, 2009). External factors include international trade agreements, which usually affect the livelihood of those who are already struggling such as farmers, fishers and informal workers. Such people are left to cope as best as they can by finding alternative means of making a living or working several temporary or uncertain jobs. Their situation may even lead to

more complex problems, such as the inappropriate use of land, migration to urban areas and development of informal settlements which will add to their vulnerability (Jeffery, 1982). The mismanagement of the environment and the vulnerability of those trying to make a living by doing so, become more visible when hazards strike. Disasters are usually not new situations that emerged simply because the hazards occurred but it is easier to blame the hazard rather than admit oversight.

Various models of vulnerability adopt a multidimensional approach to explain how different forces interact to create vulnerability. Blakie et al. (1994) put forward the Pressure and Release (PAR) model of vulnerability which argues that disasters are a consequence of pressures from hazards on one end of the spectrum and vulnerability on the other end, Figure 2.2.

Figure 2.2: The pressure and release model of vulnerability



Source: Blakie et al., 1994

The model illustrates that vulnerability is the result of a more complex set of factors. These include root causes such as limited access to power, structures and resources. Root causes also include the political, demographic and economic systems, which influences choices and access to required resources. Blakie et al. (1994) emphasises that these root causes result in dynamic pressures at the micro and macro levels which progresses to a series of unsafe conditions of vulnerability. Conditions of vulnerability exposed to the impact of hazards result in disasters.

Watts and Bohle argument on the "space of vulnerability" is constituted by individual and communities being exposed to hazards and lacking in potential and capacity to cope and recover (Watts and Bohle 1993). Cutter (1996) developed the holistic approach to vulnerability, the "hazards of place" model which makes consideration for multiple dimensions of vulnerability including geo and biophysical hazards on one hand and social vulnerabilities on the other hand. The common argument in the various models of vulnerability all refer to people and their inability to cope with being impacted by hazards because of certain contributing factors. In some instances, those who are vulnerable are not always responsible for causing the vulnerability.

Vulnerability can result from others who may have occupied a particular area previously (Anderson, 1995; Lewis and Kelman, 2010). In some instances, the present occupiers of an area are unaware of their vulnerability. This could include events that are embedded in the history of places including their colonial past. For example in the Caribbean the occupancy and exploitation of islands in the past still contributes to their present day vulnerabilities (Lewis, 2009, Lewis and Kelman, 2010). Specifically the Caribs in Dominica were driven off their lands which were seized and sold by Europeans settlers for plantation agriculture in the 17th and 18th century (Honychurch 1997). The Caribbean region as a whole had similar land acquisition processes where the indigenous population were forced to move to remote areas and to occupy marginal lands while most of the fertile lands were used as large plantations for various crops by European settlers. This resulted in a skewed pattern of settlement and development on some islands which is discussed in more detail in chapter 4.

“Land degradation began with the colonial plantation system, when lowlands forests were cleared to establish sugar plantations” (Potter et al., 2004, p. 125). Land degradation continued even after the end of colonialism with little efforts to replenish the vegetation. This exploitation contributed to soil erosion and increased the landslide probability in many island states. In addition, much of the wealth from the plantations did not remain in the islands but was sent back to the colonising nation. As such many of the Caribbean islands remained poor and under developed which caused social unrest in some areas (Potter et al., 2004). Despite the evolution of vulnerability rooted in the period of colonial rule and aggravated by the impact of various hazards, not much was done to reduce vulnerability to hazards. The historical response to hazards was to send relief or aid without addressing local capacity to deal with hazards

Small Island Developing States are generally vulnerable but some are more vulnerable than others. Factors which contribute to the differences in vulnerability include island size, although smaller does not automatically mean more vulnerable. Other factors contributing to island vulnerability include disaster management capability as well as demographic and economic status (Pelling and Uitto, 2001). The significance of island vulnerability is that a single event can devastate an entire island state (Lewis, 1999; Bisek, Jones and Ornstein, 2001; Heileman and Corbin, 2004). The vulnerability of islands to hazards stems from a combination of multifaceted factors, which include smallness, remoteness and other external factors. Island vulnerability is discussed in more detail in chapter 4.

2.5.2 Poverty and Vulnerability

While poverty and vulnerability are related, they are not synonymous and the poor may possess a certain level of coping capacity. Research led by O’Keefe in the mid-1970s emphasised that poverty was a critical driver in the exposure to natural hazards and by extension disasters. Poverty is a process driven by capitalist modes of production which marginalised those engaged in pre capitalist production. Characteristics of the marginalisation process included under-employment, temporary employment, limited access to services, lack of

representation, weakened social networks and reduced social cohesion resulting in exclusion. Traditional norms including coping mechanism to deal with disasters were over shadowed. Hence there is a need to explore vulnerability at the household and community level rather than at a macroeconomic level.

"Vulnerability comes not only from being poor, but from being powerless to do anything about vulnerability which results from the actions and activities of richer, and therefore more powerful groups (Lewis, 1999, p. 24). Generally, the poor are often more vulnerable to disasters (Cuny,1983 ; Lewis,1991; Twigg, 2001). Poverty deprives people of access to resources and reduces their ability to prepare for hazards and recover from the impact of hazards on their own (Anderson, 2001; Fothergill and Peek, 2004; McEntire, 2004). Poverty also reduces the ability of people to mitigate risk, occupy safer locations and undertake risk reduction measures (Phillips et al., 2010). The poor are more exposed to hazards and are more likely to be affected.

The impact of disasters on the poor is evident at the country level as well as the community and household levels (Anderson 2000). Disasters affect poor countries, poor communities and poor people disproportionately. The poor may lose all they have and usually have no reserve to fall back on (Anderson 2000). The poor, with limited access to finance, are more likely to live in hazardous locations such as flood prone areas and steep hill slopes without mitigation measures in place. In some instances the poor can only afford lands in high risk areas because they are cheaper. In a number of instances the poor opt to occupy lands illegally. Construction on lands acquired illegally may be temporary and any development cannot be insured as they lack ownership titles. The poor are also more likely to live in poorly constructed homes that cannot withstand winds, rain, earthquakes and other hazards. Moreover, many homeowners construct their own homes with the assistance of family and friends because they are unable to employed skilled builders. Hence building codes and standards are usually not considered in such constructions.

In relation to lack of access to resources the poor are usually those persons employed in insecure or temporary occupations and may lose both their

belongings and their livelihoods and can become poorer following disasters. They are usually the people employed in agriculture, fishing, craft making and domestic employment especially in the tourism industry which are the sectors that face the most significant setbacks in disasters. Their employment status and usually low educational achievements means that the poor are less likely to have insurance, cash reserves or collateral to borrow and repay loans. Insurance premiums are usually high and unaffordable for the poor and it is not profitable for insurers to operate in small states (Anderson 2000). The poor often lack the political power to make and change decisions that will reduce their vulnerability to disasters. They are also more dependent on the state for recovery which they may not get or have to wait for a long time to get.

UNECLAC (2005) found that there is a close link between natural hazards and poverty, slums and communities disproportionately affected by natural hazards. In many instances the institutions in some islands are weak or they lack the capacity to enforce effective land management and building guidelines. As a result many flimsy dwellings are allowed to spread out in highly vulnerable locations without amenities or protection against hazards. In addition local communities are so focussed on their daily struggles for better living conditions and do not pressure their political leaders to do more to reduce vulnerability to disasters (Manuel-Navetté, 2007). The government of some Caribbean islands have developed housing and land distribution programmes to assist people with either no income or low income with the opportunity to own homes and lands. These efforts however need to be matched with income generating opportunities so that people can attend to their basic needs, maintain their families and reduce the dependency on the state and other sources such as remittances and trading of illegal drugs.

Disasters can cause an increase in prices for food, fuel and other items which makes the poor more vulnerable. “Disasters are both a cause and an effect of poverty; and poverty is both a cause and effect of disasters” (Anderson, 2000, p. 3). The poor are more likely to try to maximise the use of natural resources to earn a living such as overfishing and over cultivation which then makes these environments more vulnerable to hazards. The continuous loss of crops, boats, stalls and other means of earning a living are difficult for poor people. In addition

many poor countries are in a continuous state of recovery and this means that the state is unable to focus on effective poverty alleviation. In poor communities the close-knit relationship has resulted in people working together to rebuild their communities after disaster and continue their lives, in some cases better than wealthier communities. Strong community networks and common identity and goals have helped communities to manage in disasters but they are not resilient.

Hazards also affect the non-poor, but they are usually in a better position to respond and recover in a timely manner. When hazards affect vulnerable people they are left physically weak, economically impoverished, socially dependent, humiliated and psychologically harmed (Chambers, 1989). This impact is more likely to occur if people lack the capacity to prevent physical harm, the resources to continue to function after the impact of hazards and lack access to mechanisms to address their social and psychological needs. Vulnerable people can be thrust into a worse state of poverty than before the disaster occurred. Blakie et al. (1994) posit that vulnerability is the progression of deep-rooted problems which result in dynamic pressures in society and leading to unsafe conditions of vulnerability. Access to the capacities to address vulnerability might be external to those who are vulnerable. Addressing vulnerability is a multi-dimensional process of identifying the causes and factors affecting vulnerability and engaging with multiple stakeholders at all levels in society and with support from local, regional and international stakeholders.

2.5.3 Vulnerability Analysis

Despite decades of research on vulnerability, little has done to reduce of vulnerability (Fordham et al, 2010). There is still too great a focus on responding after hazards have left scars on people and the environment. There is a clear need to objectively assess and reduce conditions that increases disaster risk. “Vulnerability analysis begins with the crucial acceptance that vulnerability is often part of the normal, becoming apparent and obvious to some only with the impact of a hazard” (Cannon, 2000, p. 2). While people generally have no control over the occurrence of hazards, their capacity to withstand, cope and recover depends

on their level of vulnerability. Earlier vulnerability assessments focused on choosing safer locations, proper design and construction techniques in addition to positive development (PAHO, 1994). These assessments addressed the physical aspects of hazards, but there is need to direct attention towards improving people's social and economic conditions. Failure to address the underlying causes of vulnerability and other social issues, such as poverty, will only lead to a re-creation of disaster risk (Lewis and Kelman, 2012).

> *Vulnerability analysis in the community examines its susceptibility to the full range of environmental hazards, identifies human and material resources available to cope with these threats (capacity assessment) and defines the organisational structure by which a coordinated response is to be made (plan development) necessary for preparedness (Perry and Lindell, 2003, p. 338).*

Vulnerability analysis is useful to assess disasters within their socio economic, political and environmental context. Vulnerability analysis can help guide the formulation of approaches and policies directed towards preparedness and relief provision (O'Brien, O'Keefe and Devisscher, 2011). Failure to address the underlying causes of vulnerability before addressing preparedness and mitigation can be disadvantageous (Cannon, 1993). Vulnerability is not static and does not occur overnight, but accumulates over time from unchecked conditions. Defining vulnerability is difficult, which also makes assessing vulnerability difficult, but, critical to reducing risks to disasters. Cuny (1983) suggested that one way to reduce vulnerability is to reduce poverty and place disaster response in the context of development.

2.5.4 Resilience

Resilience means different things in both different disciplines and sectors of a society. Hollings (1973) used the term resilience in relation to ecological systems. Resilience in this sense refers to the "Measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (Hollings 1973, p.14). The early focus on resilience is related to its Latin roots of bouncing back, while more recently, the focus has been on the process of bouncing forward (Manyena, 2006).

This suggests a progression to a state that is better than before, but with continuous improvement taking place. Resilience includes mechanisms for avoiding impacts or absorbing them by coping (Alexander, 2011). This includes coping and adaptive capacity on a long-term basis.

Resilience has also been used to describe the capacity of systems to maintain their integrity and the relationship and balance between elements in the presence of significant disturbances, by drawing upon internal resources and competencies to manage the demands, challenges and changes (Paton and Johnston, 2001). Communities that are vulnerable to hazards have little or no internal capacities to draw on. Furthermore, community resilience depends on the robustness, redundancy and the rapid accessibility of a set of networked capacities (Norris et al., 2008). These capacities include economic development, social capital, income generation and community competence.

The World Bank (2010, p.13) declares that, “People do not wait for help to begin repairing their homes and rebuilding their lives, but the poor, with nothing to fall back on, may require help”. Without assistance, they are more likely to take a long time to recover, thereby increasing their vulnerability and reducing their resilience. In many cases, they are impacted by another disaster before they can recover from the previous one, as is often the case in the Caribbean. People usually aim to rebuild quickly, so they can carry on with their lives, but not necessarily to a better standard. Lewis and Kelman (2010) suggest that for resilience programmes to be effective they should encompass a wide range of training and capacity development, where communities are knowledgeable of their risks and how to reduce them. Traditional coping skills, such as mutual self-help can be integrated into development programmes to reinforce resilience (Lewis, 2009; Lewis and Kelman, 2010). These capacities have been eroded because of neglect and dependence on external assistance. Communities need external support but fare better when that support helps to strengthen existing capacities.

There are good examples of communities that have used disasters as opportunities to build resilience. The Vietnamese community of New Orleans was able to recover quickly after hurricane Katrina in 2006 because of their

cohesiveness. They also benefitted from the leadership of their priest, Father Vien Ngugen. Community members helped the elderly rebuild their homes, stayed in touch with each other, relatives helped with loans, there were labour exchanges, childcare services and they sourced any support the community needed to recover. Within two years, about 90 per cent of the residents had returned and about 90 per cent of the businesses had restarted (World Bank, 2010). When people take ownership of their community, they are in a better position to identify their vulnerabilities and needs and then they can source what they need to build their capacity.

2.5.5 Capacity building versus Capacity development

There is some ambiguity about the terms capacity, capacity building and capacity development. Capacity is used in various contexts, including international aid, development and disaster risk reduction agendas. Capacity in this study is used in the context of the disaster risk reduction and development agenda. This capacity relates to the enhancing of households, institutions and community ability to prepare, cope with and recover from the impact of hazards without suffering a disaster.

Capacity is defined by UNDP (2010, p. 2) as “the ability of individuals, institutions and societies to perform, solve problems, and set and achieve objectives in a sustainable manner”. A more comprehensive outlook on capacity is the “combination of all the strengths, attributes and resources available within a community, society or organisation that can be used to achieve agreed goals” (UNISDR, 2009b, p. 5). To be able to achieve common goals there must be an enabling environment which facilitates communication and collaboration among stakeholders. Capacity can be found at various levels including individual, organisation or institutional and societal. The UNDP (2008) refers to the enabling environment as a separate type of capacity, but others categorise it as institutional or societal capacity.

Individual capacity refers to the skills, knowledge and experience of people necessary for them to function at all levels in society. This capacity is gained through education, training, sharing experiences, practical processing and networking with others. Individual capacity, where it is available, contributes to both institutional and societal capacity (UNDP, 2008).

Organisational or institutional capacity refers to the internal policies, systems, strategies, arrangement procedures and frameworks that allow an organisation to fulfil its mandate (UNDP, 2008). Institutional support is more important for small states, because they are more vulnerable to external shocks, environmental fragility and find it more difficult to compete in international trade compared to larger states (Farrugia, 2007). In terms of the Caribbean, it is suggested that the lack of institutional capacity is evident in the poor planning and land management strategies on some islands. These shortcomings are manifested in the development of precarious structures and informal settlements in hazardous areas. The inability of regulating bodies to enforce policies and legislation is a form of institutional vulnerability, which is brought to light when a disaster occurs.

Societal capacity is a combination of individual and organisational capacity, which contributes to the development of a society. This type of capacity includes policies, legislation, institutional arrangements, leadership, political processes and power relations. A deficiency in societal capacity can hamper the development of the individual and institutional capacities.

The terms building capacity and capacity development are often used interchangeably, however, they are considered different. Capacity development is used when some capacities already exist, but need to be enhanced to achieve the desired goals (Capacity for Disaster Reduction Initiative (CADRI), 2011). On the other hand, new capacity may be introduced that was not present before and this is regarded as building capacity (CADRI, 2011). Capacity development is internally driven with external support and is based on national priorities (CADRI, 2011). Building capacity could mean an external body bringing something new, introducing it and then leaving. This has implications for the sustainability of that capacity after the source leaves.

Individual, institutional and societal capacities are all important to reduce risk to disasters. Existing capacities at all levels need to be assessed to determine what is available and how to build and develop the required capacities in the context of a particular place. UNDP (2010) assert that better criteria for measuring and articulating the capacity of institutions is needed to ensure there is tangible capacity development. Capacity development should strengthen the ability of an institution to fulfil their mandate, which will equip them to contribute better to national development goals.

Capacity development is a cross-cutting theme in satisfying the HFA and Caribbean CDM goals. Capacity should be developed at individual, household, community, institutional and national levels to be able to meet both DRR and sustainable development goals. Capacity and resilience are sometimes used synonymously. Resilience is, however, a much broader concept that encompasses various aspects of capacity, such as coping and adaptive capacity. Preparedness represents a form of capacity. "Preparedness involves building an emergency response and management capability before a disaster occurs to facilitate an effective response" (Mileti, 1999). The aim is to minimise the negative consequences of hazards on people, structures and systems (Perry and Lindell, 2003).

Researchers claim that very few people undertake preparedness even when they had recent and prior disaster experience and know they should prepare (Twigg, 2001, Kapucu, 2008, Jayawickrama, 2010). This lack of preparedness occurs even in communities where disasters occur relatively frequently (Auf Der Heide, 1989). Kapucu (2008) suggest that people view preparedness as readiness to help family friends and neighbours when the need arises. In many cases, people wait until they know the threat is imminent before they take action. Paton (2006) also noted that living in hazardous areas or having access to information on hazards does not play a major role in preparedness.

There is generally more focus on disaster preparedness than other aspects of disaster management. "Despite the attention and financial resources devoted to its achievement, the goal of ensuring sustained levels of adoption of protective

measures in communities susceptible to hazard consequences has proved elusive" (Paton, Mc Clure and Burgell, 2006, p. 105). A number of reasons have been identified as to why people do not undertake preparedness. People do not prepare because they do not want to doubt the integrity of their homes (Harries, 2008). They prefer to underestimate the risk of disasters or assume that they will be able to cope with minimum preparedness (Auf Der Heide, 1989). There could also be an over-estimation of knowledge and uncertainty about how much preparedness is enough (Auf Der Heide, 1989; Paton, 2006). Even when there is some level of preparedness, there could be a lapse in terms of when to activate preparedness plans (Paton, 2006).

The way information is communicated could also influence the adherence level to the message. People need to be provided with information that makes sense, meets their needs and assists them in making decisions. Harries (2008) suggests that the social construction of disasters influences the low impact of education campaigns on preparedness. Preparedness could include undertaking protective measures (putting together of emergency supplies) resources and household emergency plans (Paton, Mc Clure and Burgell 2006).

Measures of preparedness outlined by Miletti (1999, pp. 22-23) include:-

- Hazard and risk analysis.
- Hazard detection and warning systems.
- Identification of evacuation routes and shelters.
- Maintenance of emergency supplies and communication systems.
- Procedures for notifying and mobilising key personnel.
- Pre-established mutual aid agreements with neighbouring communities.
- Training for response personnel, conducting exercises and drills of emergency plans.
- Informing citizens through education programmes.

Perry and Lindell (2003) highlight the three interrelated parts of community emergency preparedness as planning, training and a written plan. Emergency

preparedness is being in a constant state of readiness and not a one-off action (Perry and Lindell, 2003).

2.5.6 Social Capital

Social capital has to do with the "features of social organisation such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995, p. 16). Social capital has a central role to play in both preparedness and response in the context of a community (Brien, 2005). It is therefore important to measure and understand the implications of social capital as a source of building community capacity.

There is a basic understanding in the disaster management literature that communities with higher levels of social capital are able to fare better when faced with an emergency event, as well as during planning and reconstruction (Pelling, 1998; Murphy, 2007). Pelling (1998) however, warns that social capital can also be used to gain power over others. Strong internal links can also lead to a group failing to network with those who are different to them. The real strength of resilience is in the level of inter-community links between various groups (Murphy, 2007).

Social capital is a key factor for promoting resilience in the context of a community, whether that is preparing for events or during an emergency (Wallis, Killerby and Dollery, 2004). Morrow (2008) affirms that family, friends and strong social networks in communities contribute to resilience. This social capital is usually more visible in critical times, such as disasters, and helps communities to cope better. The social capital in small communities can be eroded by partisan politics and poorly designed projects that benefit some and make others feel angry and marginalised. Communities are already very diverse in terms of their physical and social characteristics, economics, poverty, resources, and needs (Lewis and Kelman, 2010).

Building community resilience has to take into consideration the issues that affect individuals, families and communities as a whole and requires a multifaceted approach by all stakeholders at the local, national and regional levels (United Nations/ESCAP, 2008). Putnam (2000) distinguishes between two types of social capital; bonding and bridging. Bonding is internal and connects people with similar characteristics together, which can lead to a tendency to keep others out. Bridging social capital is when there are connections external to the group. This is more effective in promoting good risk reduction and community development. If binding social capital alone exists, it will limit the ability of external stakeholders to support capacity building and risk reduction programmes. Community groups can advocate on behalf of their communities to close the gap between communities and external sources and open up opportunities for community development and DRR.

2.6 Civil Society and Community Based Approaches

2.6.1 Civil Society

The civil society concept, though very sketchy, can be defined loosely as "That sphere intermediate between family and state in which social actors pursue neither profit within the market nor power within the state" (Schwartz, 2002, p. 96). The role of civil society will differ considerably between states with factors such as size, level of development and functionality and attitude of government influencing how civil society organisations operate. Firmin and Brown (2004) argue that the vulnerability of small states is responsible for shaping the functions of their civil society organisations. This is particularly the case for Small Island Developing States, such as the Caribbean, which "experiences regular annual losses due to natural hazards in the order of US$ 3 billion" (Collymore, 2011, p. 7).

Civil society organisations in Small Island Developing States have greater responsibility for decision-making and management than larger nation states. Firmin & Brown (2004, p. 11) point out that the "devolution of development planning to outer island communities in South Pacific SIDS and for resource management in Caribbean Islands, such as Saint Lucia and Jamaica, has created

space for civil society organisations to play a more direct role in local institutional arrangements". In Latin America and the Caribbean, civil society is mainly represented by a few NGOs and a large number of social organisations representing sports and recreation, service, culture, health and faith based organisations (Schwartz, 2002). Denhardt et al. (2009, p. 1276) note that "A healthy civil society provides arenas for community deliberation on matters relevant to the public interest, and familiarizes individuals with additional key democratic values such as pluralism, due process, and fairness".

Civil society organisations do not always operate in the best interest of the wider community and can be perceived negatively. A critique of civil society organisations in small states suggest that some lacked transparency, professional ethics, accountability, a clear mandate and in some instances possessed a political agenda (Commonwealth Secretariat, 2000). A lack of trust in civil society organisations can be counterproductive to efforts aimed at reducing disaster risk. Several researchers have highlighted instances of civil society and social capital providing mutual benefits to a community (Firmin and Brown, 2004; Aldrich, 2008; Teets, 2009; Kage, 2010). "A strong civil society helps to identify the areas of most acute need, facilitate implementation and provide effective monitoring" (Kage, 2010, p. 164).

The roles played by civil society include identifying and drawing attention to issues of public interest that can influence public policy (Ozerdem, 2005; Kage, 2010; CIVICUS, 2011). Civil society also highlights the plight of vulnerable people in society, such as the poor and marginalised, and works with them to bring about change. The role of civil society in some parts of the world is shunned and controversial, but in other parts their importance is generally undisputed. Grajzl and Murrell (2009, p. 2) concluded that "Greater involvement of civil society is frequently viewed as crucial in attaining development goals". Disaster risk reduction is one such goal that can benefit from the empowerment of civil society.

The National Red Cross Society in Grenada along with its partners were very instrumental in providing shelter and rebuilding livelihoods after the island wide destruction of Hurricane Ivan in 2004 (IFRC, 2008). The scale of the damage was

overwhelming for islanders and required multi-stakeholder response locally, regionally and internationally. The Grenada National Red Cross provided seeds, tools and fertilisers to 400 vegetable farmers with great satisfaction being expressed by the farmers (IFRC, 2008). In relation to housing, they assisted with repairs or reconstruction of over 750 homes and the provision of hurricane straps to another 2000 houses. In addition, they provided building materials for reconstruction, introduced innovative reconstruction measures and trained people in hurricane resistant construction techniques. They were also able to mobilise financial and material support from fellow Red Cross Societies as well as other agencies to assist with the recovery process (IFRC, 2008).

When countries experience widespread damage, it forces the government to prioritise and focus their response in terms of sectors and key areas. National resources are limited and without additional support and proactive communities the recovery process will be much slower. A civil society equipped with the right skills and resources can help to fill gaps and work with specific communities to build back better. Civil society organisations in the Caribbean are usually embedded in the community with support from a few that are external to the community, but work closely with the community. They include both formal and informal associations (Denhardt et al., 2009), which are important in shaping community development.

The disaster committee in Fancy, St Vincent reported that they did not wait for the disaster office to help them with a damage assessment report following the passage of hurricane Tomas in 2010. The disaster committee went out and compiled the report and sent it to the National Emergency Management Office. The availability of these skills within the community reduces the burden on national agencies and provides quick information to inform decision-making.

2.6.2 Community Based Disaster Approaches

There can be several variations in approaches aimed at reducing risks to hazards at the community level. They include community based disaster risk management

(CBDRM), Community based disaster management (CBDM) and community based disaster risk reduction (CBDRR). This community based approach emerged in South East Asian and has since spread globally, in particular to other developing countries. CBDRM is considered as an effective approach to advance local decision making and collaboration with local government. On the other hand, it is viewed as a strategy to transform power relations and challenge policies and ideologies that contribute to vulnerability of communities (Heijmans, 2000).

Cyclones in Bangladesh in 1970 and 1991 resulted in deaths of 500,000 and 138,000 respectively. Although both events had catastrophic impacts on Bangladesh, following the 1970 disaster the government and other agencies began to implement the Bangladesh Cyclone Preparedness Programme, a bottom-up approach aimed at communities reducing their vulnerabilities and enhancing resilience. The national government worked in partnership with other agencies to develop a community based approach to disaster management. This was different to previous approaches and a determination to learn from experience.

According to (Lorna, 2003, p.271) the aim of CBDM is to:-

" 1) reduce vulnerabilities and increase capacities of vulnerable groups and communities to cope with, prevent or minimize loss and damage to life, property, and the environment,
2) minimize human suffering, and
3) hasten recovery".

One such community-based initiative in Bangladesh is the construction of cyclone shelters. In the 1991, storm fatality rates were 3.4 per cent in areas with access to cyclone shelters compared to 40 per cent in areas without access to shelters. However, in 1994 during a storm, three quarters of a million people were safely evacuated to much improved shelters and only 127 died (Akhand, 2003; Shultz et al., 2005). The issue purpose build shelters is one that could be considered for some communities in the Windward Islands in particular those that can be separated from the rest of the islands as a result of hazards.

In contrast, hurricane Katrina that struck Louisiana in 2005 was very costly in terms of lives lost and economic damage. That is, despite hurricane experiences in other states and a sophisticated disaster management mechanism. Bangladesh, a poor country, was able to learn from their experiences and make adjustments. The same cannot be said for the USA experience in hurricane Katrina, 2005.

Another good example of community-based approach is in India. After the Gujarat earthquake of 2001 in India, a programme was set up to train and empower local masons and the community with skills in safer earthquake techniques, while incorporating local trade and culture. The programme was a success because of the ownership and involvement of the community in addition to the cooperation of local government, NGO's and international organisations.

Paton (2006) claims that communities are capable of developing capacities that would help co-exist with hazards as evident by examples in Japan and other parts of the world. He suggested that adapting is easier to do in areas where hazards are more frequent than where they are not. This is, however, not the case for many states in the Caribbean, where there a high probability of hurricanes and related events throughout each year.

Paton (2006) equates adaptive capacity with resilience. He stated that since many communities are already located in hazardous environments, it is essential to build their adaptive capacity to exist in these environments; that is the capacity to co-exist with hazards. To co-exist with hazards, community members should be equipped with the skills and resources to prevent hazards from becoming disasters. Community based disaster groups can support and drive community risk reduction programmes. However, many groups form and are then left to their own devices. Without proper support mechanisms, it is likely that they fail.

The Hyogo Framework for Action (2005-2015) prioritises disaster risk reduction at local and national level and support the establishment of strong and functional institutions to manage disasters (UNISDR, 2005). As a vehicle for a more integrated approach to risk reduction, community based disaster management

offers a way of engaging with communities and making them more self-reliant. This is important as disasters are everyone's business and both the planning and preparedness functions should be part of community development. In that sense, CBDM, with the active participation of vulnerable communities, can help to identify local hazards and devise locally appropriate strategies and development activities to reduce disaster losses.

Community participation in the development and implementation of these plans ensures ownership, and contributes to community sustainability. Using holistic approaches that incorporate the needs of local communities can provide the impetus for the development of locally owned, community-based, multi-stakeholder disaster management plans that are integrated with the periodic development plans of those areas within which these vulnerable communities reside. Disaster management plans should enable communities to prevent, reduce and effectively respond to stresses, shocks and potentially disastrous events. The implementation of such plans is an essential component of poverty reduction and sustainable development. CBDM can also influence development at the local level. However, it may not influence wider development issues that may be responsible for causing new vulnerabilities.

In some ways CBDM is similar to conventional disaster management practice, for example, the approach is premised on risk assessment. However, major differences emerge at this point. Risk assessments in CBDM are carried out in a participatory way. Communities assess their own hazards, risk and vulnerabilities. Various tools and methodologies are available for participatory risk assessment and they often need to be adapted to the local conditions. This is very different to the professional approach adopted in developed countries.

Community-based risk management has traditionally dealt with variability in weather conditions. However, long-term climate change and increasing variability will require more proactive behaviour at the community level. This will be challenging and will require a shift in the way local government and NGOs interact with local communities; a shift from reactive and often non-transparent modes to proactive approaches that are aimed at building community resilience. The

barriers to resilience building are broadly centred on two areas. Investing in capacity building, a long-term process can often be in conflict with local political aspirations and election cycles. For example, although the consequences of a hurricane affecting New Orleans were understood in terms of planning and response, this information was ignored at all levels of government, including the local level (Kates et al., 2006). However, a window of opportunity does open after the occurrence of an event, particularly after extreme events.

Disasters can provide opportunities to mainstream risk reduction into development programmes. Two opportunities in terms of housing and relocation in the Caribbean include the "build back better" initiative in Grenada after the 2004 devastation by hurricane Ivan and the Conway Relocation Project to relocate residents affected by the Conway fire in Saint Lucia in 2004. The programmes encountered many challenges which limit their effectiveness. The first set of residents affected by the Conway fire in 2004 waited eight years before they could occupy their new residence in 2012. That is only phase one of the project which is aimed at improvement in the social, economic and physical status of the residents (Lebourne, 2012). The rebuilding process in Grenada was slowed down by issues related to legal ownership of land and property (UNECLAC, 2005). In addition there was need to relocate persons from the water edge but this faced resistance from villages such as Soubise. As noted by UNECLAC (2005) "There was some misinformation about the resettlement process which has engendered fears and resistance within the village". Many islanders find it easier to fix and rebuild as quickly as possible with community support and provision of materials from relief rather than live with uncertainty of relocating to new areas.

2.7 Community Based Disaster Risk Reduction: The Case for Development

According to Hodder, (2000, p. 3) "Development can be defined as an economic, social or political process which results in a cumulative rise in the perceived standard of living for an increasing proportion of a population". Disasters and development share a close and complex relationship. Collins (2009) suggests that

because of the synergies between development and disaster reduction, that addressing one contributes to achieving the goals of the other.

In some instances, development causes disasters and in other instances, disasters hamper development. Table 2.1 identified a 4-way relationship between Disaster and Development (UN/ISDR Africa, 2004). A negative disaster-development relationship results in loss of lives and resources and an additional financial burden on nations. It could also be the result of development programmes which are detrimental to people and their environment. Conversely, a positive disaster-development relationship can provide opportunities and benefits, which contribute to long-term progress. The lack of integration between development and disaster planning can and has perpetuated an increase in disaster vulnerability (Oviatt and Brett, 2010).

Table 2.1: Disaster and Development Relationship

Negative Relationship	Disasters limit or destroy development	Destruction of physical assets and loss of production capacity, market access and input materials. Damage to infrastructure and erosion of livelihoods and savings Destruction of health or education infrastructure and personnel. Death, disablement or migration of productive labour force. Displacement of people to other countries or communities.
	Development causes disaster risk	Unsustainable development practices that create unsafe working conditions and degrade the environment. Development paths generating inequality, promoting social isolation or political exclusion
Positive Relationship	Development reduces disaster risk	Access to safe drinking water and food and secure dwelling places, which increase people's resilience. Fair trade and technology can reduce poverty, and social security can reduce vulnerability. Development can build communities and broaden the provision of opportunities for participation and involvement in decision-making, recognising excluded groups such as women, enhancing education and health capacity.
	Disasters create development opportunities	Favourable environment for advocacy for disaster risk reduction measures. Decision makers more willing to allocate resources in the wake of a disaster. Rehabilitation and reconstruction activities create opportunities for integrating disaster risk reduction measures.

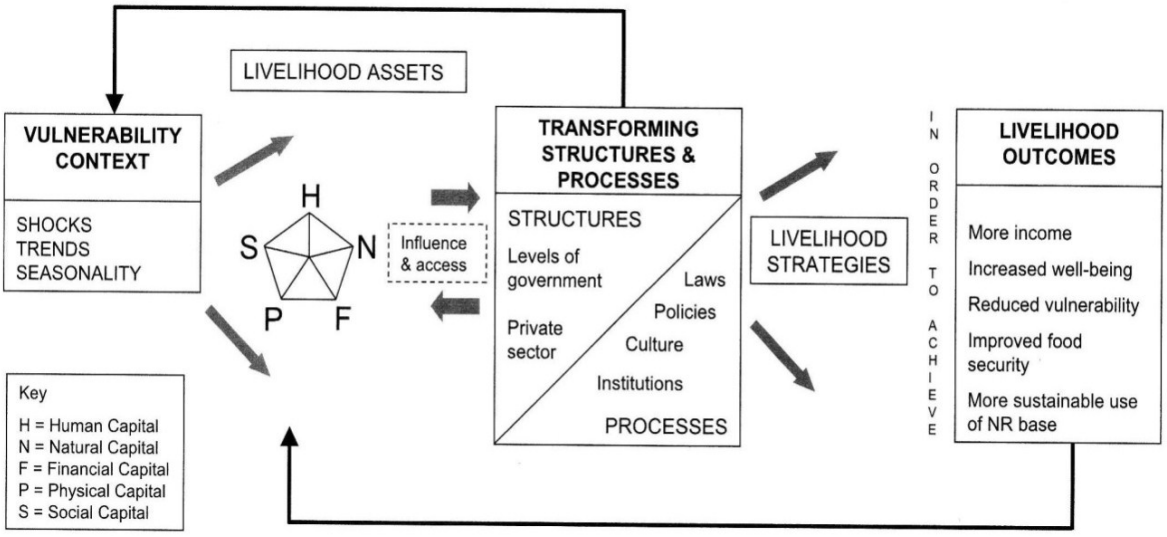
Source: Adapted from UN/ISDR Africa (2004)

Development can increase disaster vulnerability if hazard planning is not incorporated into development strategies. Failing to incorporate hazard planning in development can expose more people to the impact of hazards.

According to Tompkins et al. (2008) to reduce the impact of disasters on development, the focus should be on access to knowledge about disaster risk reduction and poverty reduction. As discussed earlier the poor suffer the most in disasters because they do not have the buffers of the more affluent in society. UN/ISDR (2008) highlighted some good practices where addressing the issue of poverty has reduced the vulnerability of communities to disasters. The studies focused on poverty-stricken communities in developing countries across the globe, from Central America to the Asian and African Continents. The projects and programmes concentrated on mitigation and preparedness while improving the housing, access to water and sustainable livelihoods of people and enhancing their resilience to disasters. It is important for people to be able to cope, respond and recover from threats posed by hazards to their livelihoods.

Livelihoods, according to Chambers and Conway (1992, p. 7), are “the capabilities, assets and activities required for a means of living” which if adequately maintained and developed can be sustainable. The Department for International Development (DFID) (1999) categorised livelihood assets as human, natural, financial, physical and social capital, influenced by structures and processes which will determine their outcome, as shown in Figure 2.3. The DFID livelihood model is considered a useful tool in understanding issues related to how people live and addressing factors affecting their livelihoods, in particular that of the poor in society (DFID, 1999). Factors affecting livelihoods assets will also influence achieving sustainable development.

Figure 2.3: DFID Livelihood model



Source: Adapted from DFID (1999).

"Our Common Future" defines sustainable development as development which "meet the needs of the present without compromising the ability of future generation to meet their own needs" (UN, 1987, p. 24). While the drive for sustainable development was heightened by the World Commission on Environment and Development (UN, 1987), the use of the term dates back to 1980 to the World Conservation Strategy in their drive to save the planet (Kirby, O'Keefe and Timberlake, 1995). The researchers based their definitions on their various disciplines and the message they hoped to convey. Despite the debate surrounding sustainable development, it is widely accepted that there are issues that affect people and the environment and if not addressed can have detrimental effects. "...The central concern for the health of human societies and the natural environment in the present and future, provides a more comprehensive, hopeful and long-term development paradigm than other models employed during the last five decades" (Gamble and Weil, 1997, p. 210).

In efforts to attain sustainability, all societies share the same four imperatives; economic, social, political and environmental development (Pantin and Attz, 2010). Global agendas, such as the MDG's and HFA, and their overall promotion of disaster risk reduction and sustainable development has guided the process. Mainstreaming DRR into development planning in key sectors is an effective means of promoting sustainable development. To mainstream is "to consider and

address risks emanating from natural hazards in medium-term strategic frameworks and institutional structures, in country and sectorial strategies and policies and in the design of individual projects in hazard-prone countries" (Benson and Twigg, 2007 , p. 5). Disaster risk reduction needs to be combined with deeper levels of structural reform to include agrarian reform, education and health reform, income redistribution as well as intergenerational equity (Glantz and Jamieson, 2000, Wisner et al., 2004, Lemos et al., 2007).

(Bisek, Jones and Ornstein, 2001, p. 17) argue that "The best protection from natural hazards is avoiding hazard prone areas, but regrettably the settlement and land use history of the Caribbean territories already place population and livelihood in vulnerable areas and land use decisions have in turn exacerbated vulnerability". Jeffrey (1981) noted that in Martinique the French occupied the Caribbean Sea side of Martinique which is the more sheltered side and the indigenous people had to settle for the Atlantic side of the island which is more exposed to storms and hurricanes. The history of the Caribbean islands showed that a similar pattern of settlement occurred in many of the other islands including the Windward Islands. This pattern of settlement increased the vulnerability of past inhabitants and their descendants who continued to live on the eastern side of the islands. These are mainly rural communities further away from the capital city where the main livelihood activities are agriculture and fishing and where development is much slower. It is also the Windward side of the islands exposed to hazards as oppose to the leeward side.

During the period of colonialism large plantations were owned by a few slave masters while the majority of inhabitants were land less as they had no titles to the lands they occupied (Williams, 2003). After independence many governments attempted various types of land reformed programmes to give people ownership and titles to lands. The progress of some programmes was slow and some did not achieve their initial objectives. In St Vincent and the Grenadines in the late 1990's the government surveyed, mapped and provided access road and transfer land ownership to hundreds of farmers mainly in the northern part of St Vincent (WB, 1997). EIA (199) reported that although the land reform programme was not as successful as envisaged, it improved the social structure and relationship in

communities. The land ownership issues in the Caribbean pose various challenges which have reduced the success of land reform and still leave many people without access to land titles. These include family lands and land fragmentation which rest not only with residents on islands but their relatives overseas. Williams (2003) reported that:-

> The prevalence of "Family land" in Grenada, i.e., land co-owned in undivided shares by the descendants of the original purchasers, is a phenomenon that dates back to the abolition of slavery. In Grenada 15% of the Land is classified as family land. There are no legal measures to recognize or to protect the integrity of "family lands".

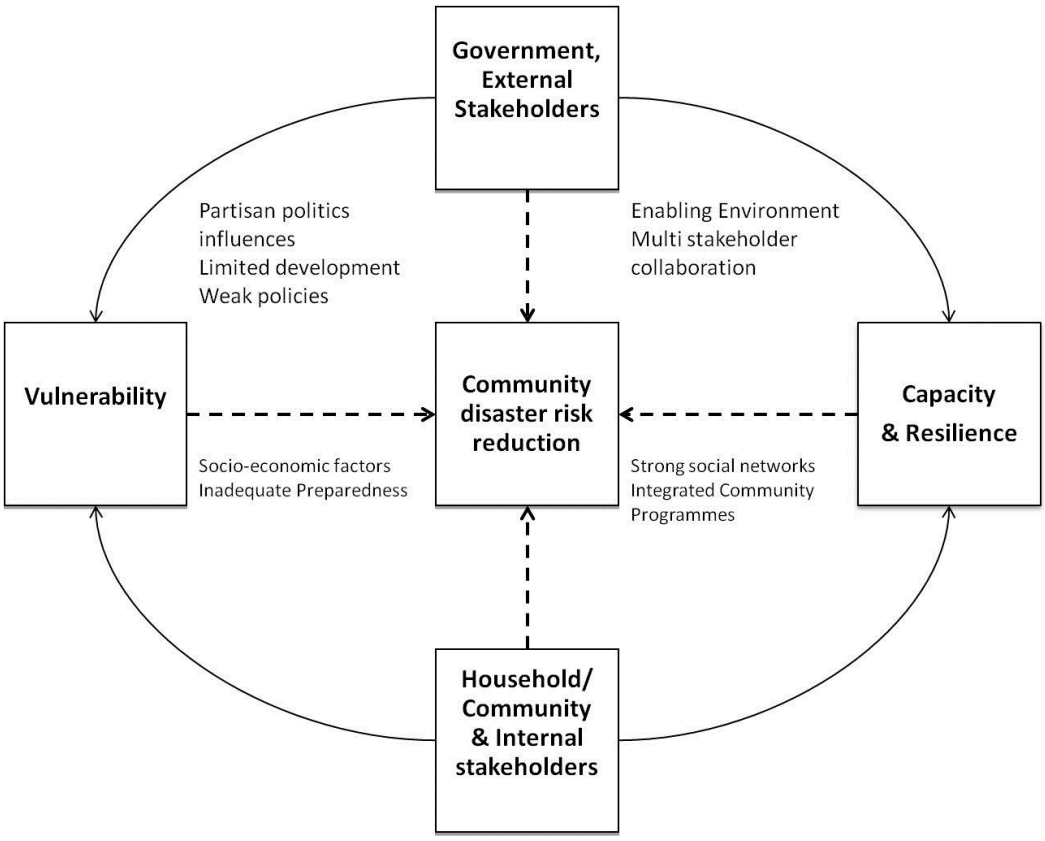
The issues of family land are common throughout the Caribbean with different variations on each island. There is disproportionate vulnerability because of the lack of development in the land management and distribution systems of some islands. Therefore a small percentage of the population still own a large proportion of the lands which means the largest proportion of the population are still landless.

The ideal approach to disaster risk reduction would be for government and external stakeholders (NGOs, academic institutions, researchers, and private sector) and communities (individuals, families, community organisations and faith-based organisations) to work together consistently. However, limitations in the human and financial resources of NGOs and CBOs constrain their ability to participate effectively in planning and decision making processes (Springer, Gibbons and Paeniu, 2002). Some CSOs are dependent on government subventions, which affect how the public views them. They are also dependent on a few people to carry out most of their functions (Springer, Gibbons and Paeniu, 2002). This lack of human capital is a serious constraint to their effectiveness in providing support to communities.

DRR is often treated as a static state of achievement rather than an on-going process. It should include assessing vulnerability (physical, social, political) and developing strategies to reduce vulnerability which are dynamic and not static. Figure 2.4 illustrates the key stakeholders and processes necessary for effective

disaster risk reduction at the community level. However, the relationships are not always positive and instead of contributing to capacity and resilience, stakeholders can create vulnerability. Community DRR should also include an assessment of existing capacity. Addressing the mismatch between vulnerability and capacity can identify gaps for resilience building.

Figure 2.4: Conceptual Framework for community DRR in the Windward Islands



Source: Author

In conclusion, the natural hazards paradigm has progressed from a focus on the characteristic of a hazard, which triggered a reaction focused on finding a technical fix. This top down approach has been ineffective in reducing risks and safeguarding lives and properties. This was followed by a shift to more proactive approaches and the involvement of community based disaster management from the bottom up. There are challenges in both approaches, which suggest the need for multi-stakeholder, partnership approaches to make disaster risk reduction more effective. This integrated approach has become more relevant since statistics in

section 2.2 shows that there is a global increase in the number of people affected as well as the cost of disasters.

The next chapter describes the philosophical and methodological approach used in this thesis to examine the vulnerability and capacity of communities to hazards. The mixed methods approach is appropriate for studying complex topics such as disaster risk reduction. The chapter also outlines the qualitative and quantitative methods used in the data collection. Ethical issues and limitations of the research and the positionality of the researcher are also considered in Chapter 3.

CHAPTER THREE

"What is important, is that whatever philosophy, approach and methodology you adopt for your research, you should be able to justify your mix in relation to your research philosophy and research question(s)"
(Gray, 2009, p. 34).

3 Research Philosophy and Methodological Framework

3.1 Introduction

The purpose of this chapter is to outline, describe and justify the philosophical and methodological approach and procedures employed in this research. The first part of the chapter explains the ontological, epistemological and methodological stance, which guided this research. This chapter then underscores the benefits of using mixed methods to study communities. The chapter further explains the techniques used to collect data including historical analysis, questionnaire survey, interviews, participant observation and focus group discussions. There is also a reflection of the data analysis processes, the research limitations and precautions.

The literature review provides a better understanding of the theory, policy and practice in relation to disaster risk reduction, in particular, as it relates to communities. Recent reports suggest that the costs of disasters are rising, especially in developed countries as they have more to lose; however, the impact on poor countries is more notable (World Bank, 2010). Key literature in Chapter 2 highlights the significance of vulnerability and capacity in minimising disaster cost and loss (Cannon, 2000; Perry and Lindell, 2003; Birkmann, 2006).

Hatwin and Percy-Smith (2007) describe the community as a group of people who are related by a common bond such as their geographical location. Communities are diverse and while they are exposed to similar hazards, the experience can be quite different across space and time dimensions. The Anglophone Windward Islands are located at the edge of the Caribbean Plate Margin and within the Atlantic Hurricane belt and are prone to a myriad of hazards. The islands are

mountainous and volcanic and like many Small Island Developing States (SIDS), their communities are located in the low-lying coastal areas.

The communities in the study were selected based on recommendations from disaster offices as having frequent impacts by adverse events and necessitate further research. In Dominica, St Joseph and Layou represents a small coastal settlement through which the largest river on the island flows and enters the sea. The river is a source of recreation and livelihood but its history of flooding and landslides puts the community at risk. In Grenada, Soubise and Marquis are also small and coastal communities, seriously affected by Hurricane Ivan in 2004 and Emily in 2005. Large families residing in precarious structures with limited livelihood options are also quite common in this area.

In Saint Lucia, the town of Soufrière is much larger than the other study areas, but is known for frequent disaster occurrences including fires, landslides, storm surges, flooding and hurricanes. The town has been completely isolated from the rest of the island in past events. On mainland St Vincent, the village of Fancy is small and is the most remote and most northern village on the island. There is one road in and out of the community and the village is limited in resources and development opportunities.

The World Bank Report (2010) indicate that 25 of the countries that incur over 1 per cent GDP loss from disasters are small island developing states, this includes 3 of the Windward Islands in this research. Therefore, the cost of disasters is substantially higher based on the size of the economies of SIDS which suffers disproportionately. The governments of these states are therefore reliant on a wide range of stakeholders for DRR support. “The strongest DRR systems are often based on direct citizen and community involvement in specific DRR activities” (UNISDR, 2011, p. 6). The concept of community remains debatable and can refer to a street, a village, a country or even a group of nations. In this thesis, community refers to geographical location. Despite their size or location, communities should aim to reduce risk to disasters as a mechanism towards promoting sustainable community development. The HFA 2005 to 2015 and CDM 2007 to 2012 promote the importance of building community resilience as

paramount in achieving DRR and sustainable development goals (UNISDR, 2005; CDEMA, 2007).

This chapter argues that because of the multifaceted nature of disaster risk reduction, it is best researched using a mixed paradigmic approach, methodology and methods. Disaster risk reduction as defined by the UNISDR includes components such as disasters, vulnerability, hazards and preparedness in relation to people, property and environment (UNISDR, 2009b). Mixed method approaches are widely used in the social and behavioural sciences (Creswell et al., 2011). Creswell et al. (2011) advocate that the mixed method approaches are suitable for research that explores real life issues, multi-level perspectives and cultural influences.

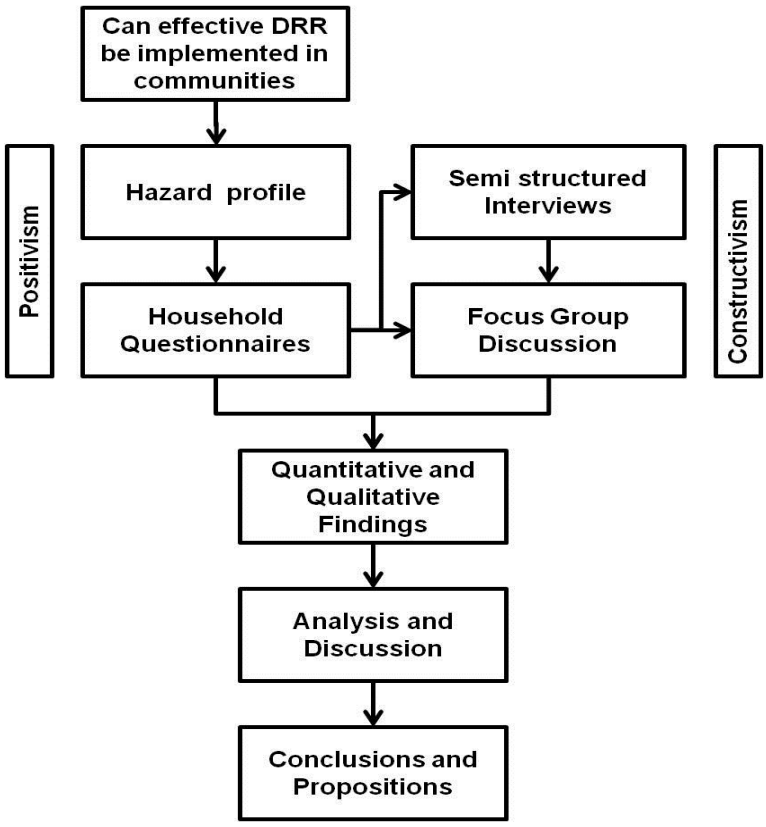
Mixed methods underscores the nature of disaster studies, which have evolved from focusing on the nature of the hazard, and more on human behaviour as it relates to hazards. In conducting research as the quote from Gray (2009) at the beginning of the chapter suggests, the important thing is ensuring that the philosophical approach is appropriate to address the research question. A more detailed discussion of the rationalisation of mixed methods research follows in this chapter. The chapter concludes with a summary of the main methodological procedures used in this research. The ethical considerations which were taken, limitations to the study and data analysis procedures are also outlined in this chapter.

Figure 3.1 presents the mixed methods research processes undertaken to assess disaster risk reduction in communities in the Windward Islands. The research uses both a positivist quantitative and interpretivist qualitative approach to collect data from multiple stakeholders. The quantitative and qualitative findings are analysed, discussed and merged to achieve the research aim and objectives and arrive at meaningful conclusions.

3.1.1 Research Aim and Objectives

As stated in Chapter 1, this thesis aims to examine the vulnerability and capacity of communities to hazards in the Windward Islands and suggest strategies to reduce risk and build community resilience. Building community resilience has been one of the areas pinpointed for special attention by policy makers and practitioner. The researcher has been a practitioner engaged in disaster risk reduction and will have the opportunity to test propositions put forward by this study. Propositions can be refined and recommended for other island communities with a view to reducing vulnerability and building capacity in Small Island States. To achieve the outlined aim, the research will look at factors affecting vulnerability and identify existing capacity in the Anglophone Windward Islands. This will be complemented by an analysis of some of the programmes initiated by government, NGOs and community groups aimed at reducing disaster risk.

Figure 3.1: The Research Process



Source: Author

3.2 Philosophical Underpinning of the Research

Research is “A systematic enquiry which is reported in a form which allows the research methods and the outcomes to be accessible to others” (Rice et al., 1996 p. 4). Research has to be meaningful and centred around an existing problem or concern and add value to knowledge. In addition, research should be firmly grounded on certain philosophical beliefs, which shape the choices undertaken throughout the research process (Denscombe, 2010).

This research process is guided by the broad philosophical approaches referred to as “the trio of the philosophy of science” (Moses and Knutsen, 2007). They are epistemology, ontology and methodology, which form the foundation and design of this research into community vulnerability and capacity to hazards. According to Denscombe (2010) the philosophical approach used in a study has implications for the perspectives taken, the nature of the investigation, methods, research questions and the quality of the research, as well as the conclusions drawn.

Grix (2011) suggests that the research process should flow logically starting with ontology to epistemology followed by methodology then research methods and end with sources. On the contrary Crotty (2002) suggest starting with methodology and methods and then to justify and place them within the necessary philosophical framework. This research will use the approach suggested by Grix (2011) since the ontological position taken by a researcher will guide the relationship between the researcher and the research as well as how the knowledge of the social world is acquired. Therefore, this research moves from ontology to epistemology and then methodology.

“Ontology refers to the way the social world and the social phenomena or entities that make it up are viewed” (Matthews and Ross, 2010, p. 24). Ontology has to do with the way things really are and how they work, such as how people in communities live and cope with hazards. The nature of reality can be explored through various viewpoints including objectivism, constructivism and realism.

This study adopts elements of the two main ontological positions of realism and constructivism. Constructivism is based on the assumptions that "the social phenomena making up our social world are only real in the sense that they are constructed ideas which are continually being reviewed and reworked by those involved in them (the social actors) through interaction and reflection" (Matthews and Ross, 2010, p. 25). In relation to hazards there are multiple realities being constructed and shaped by people in society. It is therefore important to understand how different stakeholders view hazards and the decisions they make based on their assumptions. Realism at the other end of the spectrum to constructivism, views the social world as existing out there to be discovered irrespective of our beliefs. It is centred on a single reality that is governed by the laws of nature (Denscombe, 2010). This research is not simply interested in identifying community vulnerability, but in delving deeper to gain an understanding of the factors influencing vulnerability and how they can be addressed.

Epistemology is the theory of knowledge referring to the process by which we gain our knowledge of the social world (Denscombe, 2010). In the case of this research, providing the answer to the research question of whether effective disaster risk reduction can be implemented within communities? There are two main epistemological approaches which can be taken positivism and interpretivism. They are usually considered as being incompatible in a single research project. "...Mixed methods emphasize this humanistic conceptualization of the research process more so than the other two monolithic methodological approaches/movements. In such a humanistic framework, incompatibility issues are irrelevant" (Tashakkori and Teddlie, 2010, p. 273). There are other variations of epistemology, which include; structuralism, postmodernism, post structuralism and constructivism.

The epistemology position also examines the relationship between the researcher and the researched. The epistemological position frames the level of interaction the researcher has with the researched. The epistemological view is linked to the ontological position and influences the methodological approach taken in the research. This research adopts a multiple paradigmic position of positivism and

interpretivism within a mixed method approach. Adopting this approach is appropriate to achieve the aim and objectives of this research.

3.3 Mixed Methods Approach

The use of mixed methods in research has been traced back to the 1950's in a study by Campbell and Fiske on validity of psychosocial traits (Creswell, 2003). At the moment there is still much debate about its effective use in social research. There are concerns about whether "Mixed Method" is mixing paradigms, methodology or methods or whether it involves the use of multi models or multiple methods or triangulation (Tashakkori and Teddlie, 2008; Brazeley, 2004).

A multi method approach is not considered as mixed method, as it involves the use of various methods within the same research paradigm in a single study (Spratt, Walker and Robinson, 2004; Hall, 2012). Tashakkori and Teddlie (2008) argue that a mixed method approach is more than the mixing of the research methods and that mixing can be done at any or all stages in research. In this case, the definition by Johnson and Onwuegbuzie (2004, p. 17) applies "Mixed methods research is formally defined here as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study".

Hall (2012) noted that a mixed method study has the option of taking an aparadigmatic stance, where it ignores paradigms. He further stated that no research is really paradigm free. A mixed method research can also use multiple paradigms or a single paradigm (Hall, 2012). Hall (2012) suggested that there are three (3) possible options for using a single paradigm in a mixed method research; the transformative paradigm, the pragmatic paradigm and the critical realist paradigms. According to Johnson & Onwuegbuzie (2004, p. 16) "research approaches should be mixed in ways that offer the best opportunities for answering important research questions". In this research, the mixed method approach provides a more conclusive way of answering the research questions by engaging multiple stakeholders. There are several purposes for mixing methods

identified by Greene, Caracelli and Graham (1989) including triangulation, complementarity, development, initiation and expansion (Table 3.1).

Table 3.1: Purpose for Mixing Methods

Purpose	Description	Rationale	Key theoretical sources
Triangulation	Seeks convergence, corroboration, correspondence of results from the different methods.	To increase the validity of constructs and inquiry results by counteracting or maximizing the heterogeneity of irrelevant sources of variance attributable especially to inher-ent method bias but also to inquirer bias, bias of substantive theory, biases of inquiry context.	Campbell & Fiske, 1959 Cook, 1985 Denzin, 1978 Shotland & Mark, 1987 Webb et al., 1966
Complementarity	Seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from the other method.	To increase the interpretability, meaningfulness, and validity of constructs and inquiry results by both capitalizing on inherent method strengths and counteracting inherent biases in methods and other sources.	Greene, 1987 Greene & McClintock, 1985, Mark & Shotland, 1987, Rossman & Wilson, 1985
Development	Seeks to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions.	To increase the validity of constructs and inquiry results by capitalizing on inherent method strengths.	Madey, 1982 Sieber, 1973
Initiation	Seeks the discovery of paradox and contradiction, new perspectives of frameworks, the recasting of questions or results from one method with that from another method.	To increase the breadth and depth of inquiry results and interpretations by analysing them from the different perspectives of different methods and paradigms.	Kidder & Fine, 1987 Rossman & Wilson, 1985
Expansion	Seeks to extend the breadth and range of inquiry by using different methods for different inquiry components.	To increase the scope of inquiry by selecting the methods most appropriate for multiple inquiry components.	Madey, 1982 Mark & Shotland, 1987 Sieber, 1973

Source: Greene, Caracelli and Graham (1989)

The purposes for mixing methods highlighted by Greene, Caracelli and Graham (1989) validate the richness of mixed methods to a research project. A piece of research is likely to fulfil one or more of these purposes and is ideal for improving the validity of the conclusions made. In relation to this research, the researcher engages with both positivism and interpretivism epistemology to address the problem of effective community risk reduction. Community risk reduction is a complex issue, which encompasses multiple stakeholders and requires different levels of interaction to address the gaps. Therefore mixing methods provides the best opportunity to do so. Despite the inconsistencies surrounding mixed methods research, there have been many studies that underscore the benefits of using mixed methods in a single study.

The main strengths and weaknesses of the mixed method approach are highlighted in Table 3.2. It is clear from the comparison that there are more strengths than weakness in a mixed methods approach.

Table 3.2: Strengths and Weaknesses of Mixed Methods

Strengths of mixed methods	Weaknesses of mixed methods
• Words, pictures, and narrative helps to add meaning to numbers. • Numbers add precision to words, pictures, and narrative. • Strength of using both Quantitative and qualitative research. • Can generate and test a grounded theory. • Can answer a broader and more complete range of research questions • Can use the strengths of one method to overcome the weaknesses in another. • Stronger evidence for conclusion through convergence and corroboration of findings. • Add insights and understanding • Can increase the generalisability of the results. • A more complete knowledge necessary to inform theory and practice. • More realistic in a changing context	• Researcher has to learn and understand multiple methods • Purist contends it is best to work in one paradigm. • It is more expensive. • It is more time consuming. • Unclear areas such as paradigm mixing, how to qualitatively analyse quantitative data, how to interpret conflicting results). • Can be difficult for a single researcher to do both qualitative and quantitative research. • Conclusions less evident

Source: Adapted from Johnson and Onwuegbuzie (2004)

It is evident that the benefits of using mixed methods outweigh the weaknesses and adds value to the research project. It benefits by capitalising on the strength and reducing the weaknesses of the approaches used on their own. When mixing methods it is important to consider the priority given to the quantitative and qualitative aspects, the order in which they are undertaken and the stage at which they are integrated in the study (Creswell, 2003).

In terms of priority both methods could be given equal priority, or either one can be given a higher priority. In relation to the order, both methods can run concurrently or sequentially (Johnson & Onwuegbuzie, 2004). If done sequentially the researcher has to determine whether the quantitative or qualitative method will come first and which will follow. Johnson and Onwuegbuzie (2004) stated that a mixed method design should include the integration of both methods at some point in the study. In this thesis, there is integration from the findings with qualitative data complementing the quantitative findings. There is further integration in the analysis and discussion to address the research aim and objectives.

A mixed method approach is appropriate for this research as it allows the incorporation of the views of multiple stakeholders and making suggestions of practical outcomes from the research. Household questionnaires were both closed and open ended and provided numeric and narrative data. Focus group discussions provided in-depth information from householders on how they make decisions on how to cope and manage in relation to hazards. Semi structured interviews captured details of community interventions aimed at development and disaster risk reduction. Participant observation accounted for things that were not disclosed by the research participants, but were captured by the researcher in notes and photographs.

3.4 Positivism and Quantitative Research Methods

Positivism is linked to the realist ontology. Positivism was historically based in the natural sciences and relies mainly on experiments to make predictions and explanations of the world (Blaxter, Hughes and Tight, 2006). The positivist approach places emphasis on value free investigation and objectivity where the

researcher is detached from the research. Positivists "Believe that the world is essentially knowable, that it consists of knowable facts; and that if we ask the right questions in the right way, carry out the right research methods, carry out the right experiments and processes, we will discover these facts or truths" (Wisker, 2008 , p. 65). As such, social reality is seen as external to human existence. Researchers operating in this framework undertake quantitative measures, such as large scale surveys, which generate statistics. Positivism is used to ascertain correlations between variables but is unlikely to help understand people's vulnerability and choices relating to disaster risks.

Quantitative research methodology is affiliated with the positivist epistemology. "Quantitative research is the systematic and scientific investigation of quantitative properties and phenomena and their relationships" (Research Methodology, no date). Researchers operating in this paradigm are interested in measuring causation or relationships between variables. It also includes the use of numerical means of enquiry to acquire knowledge. This has implications for what can be measured and the conclusions that can be drawn from the findings.

Quantitative research "Generates statistics through the use of large scale survey research, using methods such as questionnaires or structured interviews" (Dawson, 2009, p.16). The quantitative researcher is interested in findings that can be generalised to the larger population. Quantitative methods enable identification of multiple factors influencing household and community vulnerability and capacity. The main quantitative methods included historical profile of hazard and questionnaire survey.

3.4.1 Organisations in the Field

The researcher received sponsorship for this research through the Paul C. Bell, Jr. Risk Management Program Phase V RFA "Bell Fellowship" (FIU, 2010). The scholarship was administered through the Latin American and Caribbean Centre of the Florida International University. Support for the scholarship stemmed from various sources including the US Agency for International Development (USAID),

and the Bureau for Democracy, Conflict and Humanitarian Assistance, Officer of Foreign Disaster Assistance (DCHA/OFDA). The funding supported studies in disaster and emergency management for nine students from the Latin America and Caribbean Region (FIU, 2010).

The National Disaster Offices in each of the Anglophone Windward Islands provided various levels of support for this research. They were informed from the planning stage about the research aim and objectives and how the research will contribute to building national capacity on disaster risk reduction, especially as it relates to communities. Initially, the Disaster Offices were asked to provide information on vulnerable communities, key informants, groups and organisations in these communities. This information was used to guide the selection of study communities. Some offices also provided feedback on the questionnaire instrument before it was finalised. Requests were also made for documents such as situation reports, past disaster data, community organisations, national emergency and disaster plans and legislation and assessment reports.

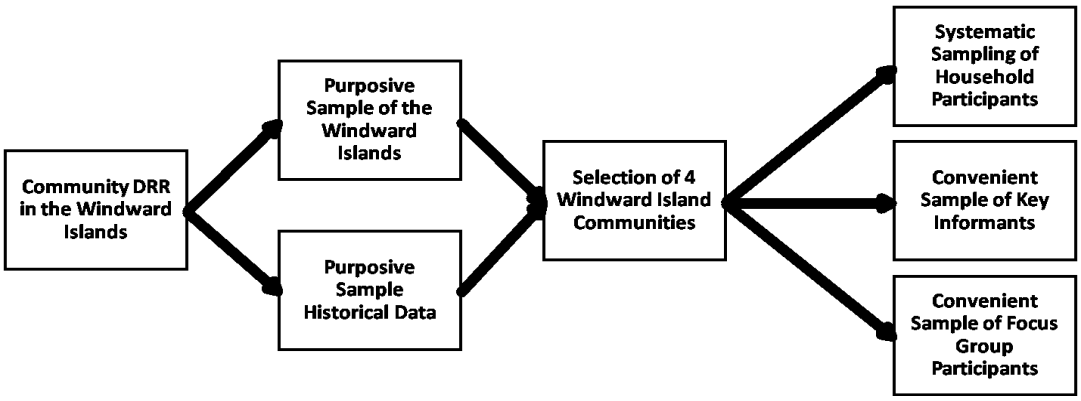
Some offices provided support in duplicating questionnaires and consent forms. Assistance was also provided in terms of workspace during a field visit and in making logistical arrangement for the administration of the fieldwork. This also facilitated the use of the Internet and telephone as well as in preliminary analysis of data. The collaboration also benefitted from the support of office staff and support facilities, such as a kitchen and use of restrooms.

3.5 Population and Settings

“Sampling should not be considered merely as an afterthought, but should be planned as an integral part of the overall research design” (Gray, 2009, p.59). In conducting a small-scale study such as this, it is neither resourceful nor necessary to study the entire population. Financial and time constraints limited the sample to a feasible amount.

Samples can be selected randomly, that is a probability sample giving everyone in the population the chance of being selected and allowing generalisations to be made on behalf of the entire population (Laws, Harper and Marcus, 2003). They can also be selected using a more flexible or a non-probability sampling procedure (Matthews and Ross, 2010). This research uses both probability and non-probability sampling, Figure 3.2.

Figure 3.2: Sampling Strategy



Source: Author

A probability sample can be of various types including a simple random sample, stratified, systematic, cluster and multistage sample selection. Communities were selected using the systematic random sampling. Systematic random sampling is selecting a certain number, such as every 10 households, from the sample population in a logical way. This is useful if there is no obvious characteristic in the community that will bias the sample. The researcher visited the communities before starting the data collection to make observations and gather basic information about the communities. Section 3.5.2 gives more details of the household sample, which was selected using the systematic random process.

It is quite difficult to obtain a random sample when conducting qualitative research, because the focus is not on numerical patterns, but on the perception of people (Sarantakos, 1998). Hence, a more flexible or a non-probability sampling procedure is more suited to qualitative data. Options of non-probability sampling are quota sampling, snowball sampling, convenience sampling, purposive and theoretical sampling. The selection of the key informants were based mainly on their availability to be interviewed, however they were people who were selected

or suggested as possible interviewees based on the organisations they were involved with. They are the people who are directly related to the subject being researched and they fit the purpose of the research (Matthews and Ross, 2010). The focus group participants were also selected based on their availability. The selection processes are discussed in more detail in the following sections. The key thing about doing qualitative research is that the researcher is not restricted to a single process, but can make adjustments as the research is taking place. That is to say, if some key informants are unavailable, others can be added and can be recommended from those already interviewed. This is unlike quantitative research, which has to be standardised before going to the field to reduce bias and allow for representativeness.

3.5.1 Selection of the Windward Islands

The Windward Islands are considered suitable for this research based on previous research by the researcher, the hazard history of the islands and the limited number of disaster related studies on in the Windward Islands. The four (4) Anglophone Windward Islands (Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines) are volcanic in origin and consist of active volcanic centres (Amad, 2007; Lindsay, Richard, John and Ali, 2005).

The islands are physically small and one hazard can affect an entire island state. Most settlements and critical infrastructures are situated along the coastal plains (Ishmael, 1991). This increases their vulnerability to storm surges and other coastal hazards. The islands are also mountainous and prone to soil erosion and landslides. These islands are therefore at risk to multiple hazards.

The economic bases of the islands are limited and dependent on a few risky sectors mainly agriculture and tourism, often affected by hazards as well as global economic trends. Since the 1950's bananas grown mainly by small scale, farmers were exported mainly to Britain. These were governed by preferential treatment and special agreements. This guaranteed a certain level of growth for the islands in terms of a ready market, but it also provided a level of vulnerability as islands became dependent on this special treatment for a long time. The removal of

preferential treatment and other problems with the banana industry has affected the livelihood of a large subsection of people in the Windward Islands, mainly from the rural areas (SEDU, 2008). Tourism is growing in importance in these islands. However, it is also a fragile industry prone to fluctuations in global economic trends, as well as national inconsistencies.

The sub region (Windward Islands) was used as the study area for an MSc thesis (Ferdinand, 2006). The research focussed on perception in relation to one hazard; hurricanes. This research takes a more comprehensive approach. Research experience was also gained from working in National Emergency Management in St Vincent and the Grenadines and in collaboration with the CDEMA participating states. The documents used in the compilation of the disaster profile of each island were drawn from archival materials from databases such as CRED EMDAT, newspapers, situation reports, government reports and reports of other organisations such as Red Cross, USAID, UNDP, UNECLAC, records compiled by disaster offices, journal articles and other accounts.

3.5.2 Selection of Communities

The research population was drawn from communities in each of the Anglophone Windward Islands, which were pre-selected before going to the field. The selected communities are the villages of St Joseph and Layou in the Parish of St Joseph in Dominica, the villages of Soubise and Marquis in the Parish of St Andrew in Grenada. In Saint Lucia, the research was centred in the Parish of Soufrière and in St Vincent the village of Fancy.

The selection of communities was based on a number of variables which included hazard exposure, location of settlements, disaster history and socio economic status. Reports on the various islands, as well as information from the disaster offices, were used to guide the selection of the communities used for this study, Table 3.3 shows the final communities selected and a brief summary of the selection criteria.

Table 3.3: The selected study areas

Islands & Study Area	Main Economic Activity	Hazard/Disaster experience	Social Conditions/Poverty Assessments	House-holds Sample
Dominica Layou & St Joseph village In Parish of St Joseph	Main national exports bananas, bay oil, vegetables, grapefruit, oranges. St Joseph fishing, farming, vending.	Island main hazards - hurricanes and storms, floods, landslides Earthquake volcanoes. Landslides Layou River flood 1997 Ecological disaster in Layou 2011.	St Joseph Parish - highest incidence of poverty 47.14% High unemployment among the poor No formal disaster committee-village council Few community organisations Mainly wooden houses Settlements close to the sea and rivers	St Joseph Village - 735, Layou village 142 Total 877 HH Sample: 98
Grenada Marquis & Soubise, St Andrew Parish	Main income - communities Sea moss farming, fishing, craft making, trafficking fruits and ground food, hair braiding	Island main hazards Hurricanes and storms, floods, landslides, volcano St Andrew received 60% damage from Hurricanes Ivan 2004 and Emily 2005.	Parish 2nd highest in national poverty 26.6% large families Few community organisations Informal settlement along the coast	Soubise – 303 Marquis – 161 Total 464 HH Sample: 104
Saint Lucia, Soufriere Parish Fond St Jacques, Palmiste and New Development	Main economic activities are Agriculture – mainly bananas. Tourism Soufrière, declining agriculture Tourism.	Island main hazards Hurricanes and storms, floods, landslides, Drought Low volcanic activity. Fire, 3 killed, 2000 homeless, 7 blocks, and 478 houses lost. 1960, 6 killed in landslide Fond St Jacques, Hurricane H. Tomas 2010 (7 deaths, 6 killed in landslide at Fond St Jacques, Soufrière	42.4% Soufriere population poor, 26.9% poor unemployed 60% dwellings built before 1996 Population est. – 8472, Least densely populated district – 434, average household size 3.0 Soufrière can be cut off from neighbouring areas in disasters. Active CBOs, disaster committee, CDRT	Soufrière Parish – 2617, study areas about 750 HH Sample: 98
St Vincent and The Grenadines Fancy	Income Nationally - agriculture mainly	Island main hazards Hurricanes and storms, floods, landslides	Low development and employment Most northern geographically remote	Fancy Village – 135

	bananas Tourism growing. Fancy mainly farming and fishing.	Susceptible to landslides, Volcano last erupted in 1979 is likely to erupt again Fancy close Volcano, can be completely cut off Hurricane Dean 2007, Tomas, 2010. Frequent landslides and floods in the community.	area Census district over 50% population in poverty, 2nd highest nationally Smallest population on the island, negative population growth Active disaster group, Red Cross Group and recently formed CDRT. Active farmers' cooperative.	HH Sample: 93

Source: Author

3.5.3 Selection of Households

Households were selected from the communities to participate in the questionnaire survey. Households were selected using systematic random sampling of every "nth" house on either side of the street. This varied from community to community based on the number of households in each community. In relation to Fancy and Soubise and Marquis, which are small communities, it was every other house on either side of the street. In the larger parishes of Soufrière, Saint Lucia and St Joseph, Dominica, the sample was at every 5^{th} house on either side of the street.

A target of 150 (600 total) respondents from each community was set as a practical number based on time and resource constraints. The final sample consisted of 393 completed questionnaires. The completion of questionnaires was hindered by the level of illiteracy identified at the beginning of the study, which dictated a change in how the questionnaires were administered. "While large samples may seem more conclusive, it is how the sample is drawn that determines how representative it is" (Bouma and Ling, 2004, p.125). The communities in the four islands did not have any characteristics that stood out in any part of the community, such that the applied sampling process would be biased. The systematic random sampling process was considered more suitable than a random sampling process and still can be used to generalise to the wider population. Laws, Harper and Marcus (2003 , p.363) stated that "the key problem with random sampling is the need for a good quality sampling frame or list from

which to select". This is often quite a challenge, especially where data is limited, unavailable or access is restricted for various reasons such as data protection policy.

3.5.4 Selection of Key Informants

Key informants are people who hold key information that can add value to the research, either as participants or pointing in the right direction or granting access to otherwise unavailable information. The key informants for the interviews were selected using convenience sampling, which is a non-probability sampling strategy.

An initial list of people who are associated with disaster and development organisations was collated. This was compiled based on suggestions from the national disaster offices as well as the household questionnaire, which asked participants to identify organisations working in their communities. The key people were contacted and given information about the study and asked to participate in an interview. Therefore, only the people who were available to participate were interviewed (Matthews and Ross, 2010).

The sampling process for the interviews also developed as the fieldwork progressed since interviewees recommended others and information which emerged during the data collection process led to the need to interview others. In Grenada, for example a housing project funded by the Chinese government generated much concern by the residents. They felt the apartments were quite small since most of their families are large; the largest family consisted of 23 members. It was then decided to interview a representative from the housing ministry on some of the issues raised by the community members; it was confirmed that their concerns were genuine.

3.5.5 Selection of Focus Group Participants

Focus groups are a form of group interview that capitalises on communication between research participants in order to generate data (Kitzinger, 1995). Participants for the focus group discussion were also selected non-randomly from among the respondents of the household survey. Participation was based on their availability, time and location of meeting. This consisted of between 6 to 8 people, which are a suitable number for a focus group discussion. Efforts were made to ensure that groups had both male and females represented.

Members of the community disaster committee, where they existed, were also invited to attend the discussion. The committee member, where present, shared information with the group about the about the community's capacity to deal with hazards and disasters. It was felt that this was necessary since many people had indicated via the questionnaire as having no knowledge of the community group or their responsibilities. In addition, many people were not involved in community groups and some felt that others in authority did not listen to their opinions. The focus group discussion allowed the researcher to clarify information collected both from observations and from questionnaires. It was a chance to learn more about how people behave and make decisions about hazards, especially when they are in imminent danger.

3.5.6 Data Collection

Data collection consisted of an analysis of secondary data as well as primary data collection. Secondary data was used in the compilation of a historical profile of hazards that affected the Windward Islands between 1911 and 2011. The main purpose for compiling a hazard profile is to understand the hazard exposure and the impact of past events on the islands and, where possible, specific communities. The information will also be useful as a guide to determine where and how to address vulnerability and capacity to disasters.

The hazard history of the islands was compiled using archival materials from databases such as CRED EMDAT, newspapers, situation reports, government

reports and reports of other organisations such as Red Cross, USAID, UNDP, UNECLAC, records compiled by National Disaster Offices, journal articles and other accounts. There were dissimilarities in the records of different sources for the same events, which limit the conclusions that can be drawn from the data in the profile.

Primary data collection included the use of both qualitative and quantitative methods to examine vulnerability and capacity to hazards in the Windward Islands. Piloting of questions is important to ensure that they are clear and collects the information that is required (Howe and Lewis, 1993). The first draft of the questionnaire was emailed to a number of people from the Windward Islands for feedback on understanding and clarity. The feedback was quite useful and guided the development of questionnaire instrument.

This was further tested in the field in St Vincent and the Grenadines with a group of 50 cadets from communities throughout St Vincent and the Grenadines. This was used to determine whether their answers showed an understanding of the questions. The instrument was also tested in a small section of the St Joseph community in Dominica. This was particularly important in Dominica and Saint Lucia where the residents speak French Creole and the possibility exists of having to translate the questions to avoid excluding anyone based on language. This was not necessary, as communication in English was very good. The challenge that arose was that of illiteracy, so rather than self-completion it was necessary to ask the questions and complete for the questionnaire for most of the participants.

The month of July was used as a preparation period to conduct piloting of questionnaires, make flight arrangements and contacting organisations via email or telephone. A period of four weeks was spent in each island to collect background information and complete data collection. The first week was used to make observations and collect information about the various islands and the research communities. Notes were made on the geography, economic activities and general background of the communities. This information assisted in identifying a suitable location within the community for the focus group discussion. The second week was used to the administer questionnaires to householders in

the communities and arranging interviews with key informants. A total of 393 questionnaires were completed from among the four islands. The specific numbers of male and female participants and total from for each island is summarised in Table 3.4. Women were mainly present at home and even when men were present, the women were encouraged to participate in the research. This accounts for the greater number of female participants than males.

Table 3.4: Completed questionnaires by gender and island.

Windward Islands	Males	Females	Total
Dominica	40	58	98
Grenada	49	55	104
Saint Lucia	35	63	98
SVG	35	58	93
Total	**159**	**234**	**393**

Semi-structured interviews with key people were completed in the third week and arrangements finalised for focus group discussion the following week. Twenty four key informants from all the islands representing government agencies, NGOs and community organisations were interviewed. The final week was used to facilitate the focus group discussion with a few participants from household surveys and a representative of a community disaster committee, where present. Three focus group discussions were conducted in three of the four islands. The logistics in Dominica did not allow the facilitation of a focus group discussion. The discussions helped to triangulate the data collected via interviews and questionnaires as well as to collect additional information on behaviour relating to hazards. The same process was repeated in each Windward Island.

Initially, it was intended to have a community meeting with participatory activities, but this process evolved based on challenges with organising large-scale community meetings. The challenges include organising location, day of the week, time of the day within the time available to complete the data collection in each island. The plans also had to coincide with travel arrangements and prior arrangements in the following island.

3.6 Informed Consent

Participants who took part in the household survey were given a brief introduction of what the research was about and asked to sign consent forms before completing the questionnaires. Some participants were reluctant to sign their name and were asked to write their names or give their names to the researcher. Participants were assured that there were no ulterior motives in collecting information from them. They were further informed of their right not to take part in the study and that they could withdraw at any time. Some participants wanted to hear or see the questions before signing consent and this was facilitated. Participants were also assured that their names would not be mentioned in the research, even though the results will be published.

Consent forms were stored separately to the completed questionnaires. Ethics do not only include aspects of anonymity and confidentiality but also the use of judgement when dealing with participants, especially in situations that can evoke emotions or make participants fearful or uneasy. Teddlie and Tashakkori (2009) noted the importance of translating consent forms for those who do not speak English. This had to be considered to ensure participants understood to what they were giving consent.

The researcher was also mindful of language and understanding during the data collection process. This was considered especially important when discussing past disaster experiences with participants. During the preparation phase, the researcher was assured that most people in all the communities were fluent in English and translation was not necessary. One elderly participant had difficulty communicating in English; however, the community liaison officer who was present assisted with the translation of some questions to Creole to ensure understanding.

3.7 Administration of Information Gathering

3.7.1 Historical Profile

Johnson and Christensen (2007) assert that historical research is important to understand the past and different influences that affected past events. A history of hazards helps people to understand the past to make decisions for the present and future. It is expected that the impact of past events and the responses and decisions made will help to inform decision-making and shape policies aimed at reducing risks to hazards and preventing disasters.

Data from documents were used to compile a disaster profile for each of the Windward Islands for the last 100 years from 1911 to 2011. The information was drawn from journal articles, reports, development plans, legislative documents and strategy papers. Various sources helped in this process such as libraries, websites and government departments, NGO's, UN and other international agencies.

3.7.2 Questionnaire Survey

Questionnaires were administered to households in one community in each of the four islands in this study. In total 393 participants completed questionnaires. This consisted of 159 males and 234 female participants. The questionnaire assessed aspects of vulnerability and capacity as well as several community variables. A questionnaire consists of a list of written questions, sent out or given to respondents to complete and send back or collected by the researcher (Laws, Harper and Marcus, 2003). A questionnaire is a useful method of gathering information from a large number of respondents. Questionnaires may consist of closed or open-ended questions or a mixture of both types, depending on the aim of the research and the information required. If the aim of the research is to gather opinions rather than numbers then open-ended questions are the more likely option to use. Open-ended questions do not provide options but leave the question blank for the answer to be inserted (Howe and Lewis, 1993). In closed

questions, each question has a series of options from which the participant can select an answer (Howe and Lewis, 1993).

This research used a combination of open and close-ended questions to gather information from community members about their hazard risk, vulnerability and coping mechanisms. They were also asked about their knowledge of community programmes and groups, their involvement and perceptions of the community disaster readiness.

There are various ways to administer questionnaires, which can influence the return rate. They can be distributed and collected or completed on the spot. This measure was used in this study since literacy is a problem. Mailing questionnaires with a return envelope is also useful, but can result in a low return rate. Because of the time constraints this was not feasible for this research. The response rate can also be influenced by the length of the questionnaire and people, in general prefer short questionnaires. While the questionnaire for this research was somewhat lengthy, the way they were administered resulted in a good response rate.

Closed questions are usually preferred since they can be pre-coded which makes collating and analysing the data easier (Laws, Harper and Marcus, 2003). One disadvantage of doing so is restricting the respondent to the options given. Open-ended questions on the other hand can be more time consuming as well as difficult to code and analyse. To make analysis easier the questions were grouped into themes and coded. The mixture of both open and closed questions was necessary in this study to best collect the required data. The questionnaire was structured to relax participant and get them interested in the research by placing the simpler and coded questions at the beginning. The open-ended questions were placed at the end of the questionnaire.

Consideration was made for local people to assist in Dominica and Saint Lucia where the locals speak French Creole. However, this was only used in one instance in Saint Lucia as the participants approached spoke and understood English. The possibility of having consent forms and questionnaires translated

into Creole was taken into consideration when planning the data collection, however this was not necessary. The researcher was also assured in the pre-planning stage that people in the study areas were fluent in English.

The questionnaires were administered between July and December, 2011 with at least one month spent in each island. Longer was spent in Dominica as it was the first island and additional time was needed to pilot and re-adjust the questionnaires before final administration. A copy of the questionnaire is available in Appendix 2.

3.8 Interpretivism and Qualitative Research Methods

The Interpretivism paradigm on the other hand, is one where the world is viewed as "Indefinable, interpreted, shifting in meaning based on who, when and why anyone carries and adds the meaning" (Wisker, 2008, p. 66). This is more in line with understanding communities and people's behaviour to gain greater and deeper understanding than the positivist approach allows. According to interpretivism the social world is culturally derived and historically situated (Blaxter, Huges and Tight, 2006, p. 60). However, understanding the complexities of communities characterised by their history and culture requires a combination of qualitative and quantitative approach.

"Qualitative research explores attitudes, behaviour and experiences through such methods as interviews or focus groups" (Dawson, 2009, p.15). The focus of qualitative research is to understand human existence and generate theory. The researcher in this case is very much involved in the research process. Qualitative research uses semi-structured or unstructured mechanisms such as interviews, focus group discussions and participant observation. The aim is to collect in-depth information about the subjects being researched, rather than presenting numerical results although qualitative data can be quantified.

This study combined both qualitative and quantitative approaches in a mixed methods design. Mixed methods research is considered as the "third wheel" in

research approach. Rather than conforming strictly to the traditional subdivide of one method as opposed to the other, mixed method is concerned with appropriateness of approach. Mixing methods uses the most suitable means of achieving the research aim and objectives. Table 3.5 highlights the main features of the two approaches.

Table 3.5: Qualities of qualitative and quantitative research

Qualitative Research	Quantitative Research
A belief in constructed reality, multiple (constructed) realities, or a non-existent reality.	A belief in a single reality
Interdependence between the knower and the known i.e. the impossibility to separate the researcher from the research subject.	The possibility and necessity of separating the knower from the known.
The inadvertent value-ladeness of the research process and its output, i.e. the impossibility to conduct research and interpret research finding objectively.	The possibility and necessity of value-free research.
The centrality of the context to the research process and findings, e.g. time-space politics, specific situation during data production, interpretation, presentation, etc.	The possibility to generalise findings beyond the contextual limits of the researched units and research situation.
The impossibility to generalise research finding beyond the limits of the immediate context.	The pursuit of identifying universal, casual laws.
The explicit focus on inductive, exploratory research approaches.	The tendency to work with large, representative samples.
The belief that research in this vein is or should be non-reductionistic, i.e. the belief in the ability to describe or explain in its entirety the complexity of phenomena under investigation.	An emphasis on deductive research via falsifiable hypotheses and formal hypothesis.

Source: Adapted from Bergman (2008, p.13).

3.8.1 Semi Structured Interviews

A structured interview is much like a closed questionnaire, which is administered orally by the interviewer. Structured interviews guide responses, but can also be very restrictive with little flexibility (Wisker, 2008). They are ideal in saving time and are quite easy to analyse using computer-based programmes.

A semi structured interview however, lends itself to the flexibility of being somewhat structured by having a checklist of questions. This design provides the

opportunity to make clarification and explore the topic more deeply if needed. They are useful in collecting qualitative as well as quantitative information as they allow the use of open-ended as well as closed questions and are fairly easy to analyse (Laws, Harper and Marcus, 2003). In this study, the researcher conducted semi-structured interviews.

The key informant interviews collected detailed information from government officials, leaders of community groups and NGOs working with the selected communities in the Windward Islands. The questionnaires and information from disaster offices were used to guide the key informant interviews. Some key informants also suggested other key informants for interviews. A checklist was prepared to guide the interview that allowed the researcher to engage with the interviewees. See Appendix 3 for a copy of the interview checklist.

The researcher emailed or called interviewees beforehand to provide them with information about the study and arrange the date, time and place for interviews. Confirmation was done before attending the interview and rescheduling done where necessary. The researcher provided a brief introduction of what the study entailed and asked key informants to sign consent forms.

Audiotaping was considered, but was not used because it was felt it was not necessary and would be time consuming to transcribe. Audiotaping is vital in ensuring that as much information is captured. However this can present a number of challenges. Some of the limitations include the long length of time required to transcribe the interview and the presence of the instrument may influence the response given. The technology can also fail in various ways, which may include problems with tapes, batteries and volume. There are, however, instances where recordings are considered quite useful in particular to capture emotions, feelings, experiences, sensitive issues and other vital information (Wisker, 2008).

Many stakeholders acting as experts impose their ideas on communities with the belief that it is what is best for the community (Hawtin and Percy-Smith, 2007). This research will gather the views of these stakeholders in terms of the needs of

communities and their roles in community DRR programmes. The views in comparison with that collected from the community will help to identify gaps for capacity and resilience building. The information collected will also inform the community meetings for further discussion and recommendations. The issues will be further analysed and addressed holistically in the dissertation and later shared with stakeholders. Table 3.6 shows the key informant category of organisation.

Table 3.6: Organisations represented in the interviews

Type of Organisation	Dominica	Grenada	Saint Lucia	SVG	Total
Government	3	2	3	3	11
NGOs	1	3	2	1	7
CBOs	2	1	1	2	6
Total number of Organisations	**6**	**6**	**6**	**6**	**24**

Source: Author

3.8.2 Focus Group Discussion

Focus group discussions are a good way to clarify issues and elicit participant views and opinions on a research topic (Creswell, 2003). Focus groups in this study were used to explore hazard experience and household decision making processes about hazards. They were also used to get a better understanding of how people felt about the community and the capacity as a community to deal with hazards and disasters. Participants from the household survey were invited to participate and agreed based on the time and location. Those who agreed to participate were reminded the day before the meeting to ensure their availability.

Each focus group consisted of between six and eight participants from the household survey and a disaster committee representative, where available. The discussion was held in a public building such as a school, church or town council meeting room. During the discussions the researcher was the facilitator guiding the group discussion and not as an interviewer. The discussions were very productive and provided useful information.

Problems with finding meeting place and a suitable meeting day and time in Dominica meant that a focus group could not be held. Refer to Appendix 4 for checklist used in the focus group discussion.

3.8.3 Researcher Observation

Participant observation was done during the stay in the communities to collect the data. The researcher found that it was an advantage to live in or close to the community being researched. This was not always possible. The researcher also participated in workshops and meetings relevant to the research. The meetings included a joint meeting along with the Soubise Adventist Disaster Committee, which was held in the Soubise, Grenada. The meeting discussed community disaster preparedness and the importance of forming a community disaster group and how people in the community can get involved. The researcher also attended a one-day workshop on the theme “Regrouping of the Community Response Teams (CRTS) on Gender Based Violence in St Lucia. The workshop was held in Soufrière, St Lucia.

The researcher attended a meeting with the National Disaster Management Office, Dominica and the Layou Improvement Committee to discuss the impact and implications of the flooding of the Layou River on July 28th 2011. There were concerns relating to tourism plans for the area and the annual Titiwi Festival, an important community event. The researcher also attended the official launch of the St Vincent and the Grenadines Regional Disaster Vulnerability Reduction Project, a joint project with the World Bank aimed at reducing risk and vulnerability in those areas. The cost of the project is estimated at US$ 20.92 million, which will come from the Pilot Programme for Climate Resilience (PPCR) grand funds and a loan from the Strategic Climate Fund (SCF) and other support. Photographs were taken of the community, buildings, the natural environment and vulnerable elements in the community. The research noted that NGOs do not exist in the Windward Islands as they do elsewhere. The organisations closest to NGOs in structure and function are faith based, that is church groups. This has implication for kind of support available for community DRR programmes.

3.8.4 Sharing the Research with Peers and Other Experts for Comments and Review

The research has gone through various dissemination processes from conception to and throughout the fieldwork and writing up stage. The feedback provided has contributed to the enhancement of the research. The research proposal was shared with the disaster management directors of the four Windward Island Study areas, the Director of the CDEMA Coordinating Unit and other disaster management experts. Important questions, feedback and suggestions helped to identified areas where clarity was and improvement was needed.

3.9 Validity and Reliability Precautions

"Validity stems more from the appropriateness, thoroughness and effectiveness with which those methods are applied and the care given to the thoughtful weighing of the evidence than from the application of a particular set of rules or adherence to an established tradition" (Brazeley, 2004, p.154). To enhance validity and reduce bias there should be prolonged involvement, triangulation, negative case analysis and audit trails (Robson, 2002). The research process was designed to ensure that the results and proposition from the research are based on sound data.

This includes the selection of sample, research design and adherence to ethical procedures. Multiple stakeholders and a wide range of documents from reliable national, regional and international sources were used to complement the research and enhance validity. A structured questionnaire was used to ensure that household participants were asked the same questions in the same way. Checklists were used to guide interviews and focus group discussions. This allowed the researcher the flexibility of probing further and clarifying responses made by participants. However, it also allowed the researcher to review the responses with participants to avoid misrepresentation of their views.

The reliability of a study has to do with whether the research can be replicated and the same results can be arrived at, if the study was repeated under the same

conditions. Reliability of the questionnaire was tested via piloting to ensure clarity and non-ambiguity. Feedback was used to finalise the instrument for data collection.

The preliminary findings of the research were presented at the Caribbean Disaster Emergency Management Conference in December 2011. The presentation was well received and generated interest among Caribbean practitioners. A summary of the main findings were also presented at the Northumbria University Research Conference, gaining first prize from among the second year research posters.

Some of the key findings of the research were published in a peer review journal (Ferdinand et al., 2012). The reviewers provided very objective feedbacks, which assisted with the subjective analysis. The researcher has also presented findings at a departmental seminar to peers and experts who posed questions about the research.

3.9.1 Practical Challenges in conducting research within disaster affected Communities

A researcher's positionality has to do with the background of the researcher and how it influences the interaction with others as part of the research (Valentine, 1997). This could include aspects of age, gender, race, work experience and training of the researcher or researched (Hopkins, 2007). This research was conducted in the Caribbean, the home of the researcher who resides in one of the study islands. In one sense, the researcher is an insider in her own island but an outsider on the other islands. This can help the interaction and willingness of participants to become involved in the study based on people's perception of the researcher (Mohammad, 2001).

Having also worked in the National Emergency Office, in particular with communities, also helps to define the position of the researcher in this study. There is knowledge of the main stakeholders working in communities as well as a working relationship with many. Valentine (1997) considers this as being good for the rapport between the interviewer and interviewees and lends itself to a rich

discourse based on mutual respect and understanding. On the other hand, to sit in an interview by a colleague may also create a sense of discomfort for some interviewees.

The researcher's position is to present the voice of the community and stakeholders and not just views based on work experiences. The approach of using mixed methods as a mean of confirming and validating the data collection reduces the influence of the researcher in the data collection. The role of the researcher is guided by ethical consideration that requires reflection throughout the research process (Hopkins, 2007).

The researcher has been volunteering in national emergencies, such as hurricanes and floods in St Vincent and the Grenadines, for over 20 years. The involvement of the researcher as a volunteer included simple tasks, such as receiving phone messages, to more complex tasks of coordinating warehouse operations.

The BA in geography completed by the researcher 2002 included a course in a disaster management, which provided a better understanding for what was done as a volunteer. This academic exposure provided an opportunity to engage more in the subject.

The MSc in Disaster Management completed in 2007 at Coventry University gave the researcher an opportunity to understand the broader concepts related to disaster risk reduction. It also provided the opportunity to engage with various stakeholders through data collection for the thesis on "Perception of hurricane risk and risk reduction strategies in the Windward Islands".

The main reasons for focussing on the Anglophone Windward Islands in relation to disaster management are based on the view that pooling resources as a region and working more collaboratively will enhance the capacity in terms of disaster risk reduction at the community-level. The islands are similar in terms of location, topography, geology and exposure to hazards and possess similar disaster experiences, but are at different levels of disaster management operations.

Working at the National Emergency Management Office with responsibility for community mobilisation has been an interesting experience for the researcher. The experience provided the opportunity to work with and understand how people at different levels in society deal with hazards.

This experience included working with stakeholders at different ends of the spectrum, international and regional organisations, nationally through government ministries and departments, NGOs, private sector and communities. International development and disaster assistance provide various levels of support to the National Emergency Organisations including financial and human technical capacity. In many instances, the assistance is subject to the ethos of the supporting organisation.

Regionally in the Caribbean, the focus is on pooling resources to provide support to the islands in all phases of disaster management. The level of support provided to each island may not be the support required by an island state. Nationally in St Vincent and the Grenadines, there are limitations in relation to the human and financial capacity but there is political will at the highest governmental level. The Prime Minister has made a commitment to address the nation at the beginning of every hurricane season.

Additionally, disaster Management received critical attention in 2001 with the adoption of the Comprehensive Disaster Management Framework and the development of the National Emergency Management Organisation in 2002. There was the assignment of a specific post of disaster management coordination as opposed to someone from within the government undertaking this in addition to their regular work responsibilities. The construction of the Disaster Office and Emergency Operation Centre in 2005 and the National Emergency and Disaster Management Act in 2006 complemented the holistic approach. However, the political will at different levels varies, including the lack of commitment from some officials on national disaster management subcommittees.

The national Disaster Management and Emergency Management Act, 2006, section 10 (1) makes provision for the establishment of district disaster

committees. In regards to this, the National Emergency Management Office have formed community disaster groups and established relationships with existing groups to include disaster management as part of their mandate. There are about 40 community organisations involved in Disaster Management throughout St Vincent and the Grenadines (Appendix 1). The Deputy Director of the National Emergency Management Office is responsible for community mobilisation in relation to other responsibilities. See job description in Appendix 5. To undertake this responsibility effectively there is clearly the need for more staff and financial support. The annual budget does not make provision for community programming which forms a part of the Emergency Organisation work programme. This area however receives support from international agencies such as USAID and UNDP. To support the community organisations in their disaster management responsibilities, the National Emergency Management provides training in various subjects. Some training courses are organised in collaboration with regional agencies such as USAID/OFDA and PAHO and with support from Caribbean Disaster Emergency Management Agency (CDEMA) and UNDP regional office. The training programmes include community disaster planning, shelter and shelter management, damage and needs assessment, training for instructors, proposal and grant writing, business continuity planning, family emergency plans, Emergency Operations Centre management and a logistical support system.

In some instances, there are large symposiums to launch interventions, such as the community disaster plan, while other programmes are undertaken on a smaller scale through the district or community. It is challenging to work with organisations in areas such as developing community disaster plans, as most communities do not have the internal capacity to support such actions. There are some training programmes such as grant writing and disaster planning which are relevant to community organisations, but it might not be necessary to train members in such areas. It might be more relevant to provide technical capacity to the organisations to help develop the plans so they can access grants for disaster and development projects.

In most instances, the same people received training in the courses being offered by the emergency management office, which can be an asset to the community

but has not proven to be so. These people are not always available to provide support to the organisations and community or to provide further training as disaster management volunteers. Currently, the National Emergency Management Office does not have the capacity to monitor programmes for effectiveness and feedback from community organisations has been minimal.

Follow-ups from the National Emergency Office in relation to grant applications offered by CIDA and the development of community disaster plans suggest there are gaps in capacity. Community groups were not able to develop grant applications and had difficulty developing community disaster plans. In the few cases where plans were developed it was in collaboration with projects by larger established organisations, such as the National Red Cross DIPECHO project. It was also noted that most of the community groups and organisations were generally inactive but react in response to activities such as hurricane and flood events.

However, despite the weaknesses in terms of planning and organising at the community level, the community spiritedness provides support and coping abilities in adverse events. This knowledge and experience left the researcher with a feeling of inadequacy in terms of the job requirements. The researcher perceived that by combining knowledge gained through academic training, volunteer and work experience that meaningful suggestions could be made towards building resilience to hazards. One of the questions raised by the researcher as a result of the interface with disaster management experience and fieldwork in the Caribbean is “How to build community resilience by capitalising on the community spiritedness that already exists in the Windward Islands”.

3.10 Ethical Considerations

This research adheres to the guidelines outlined in the Northumbria University, Research Ethics and Governance Handbook (Northumbria University 2010). Research ethics sets out protocols for the collection of data in a manner that is professional and respects the rights of participants and the public in general

(Ruane, 2005). The main concerns surrounding ethics are anonymity and confidentiality. The University policy requires application and approval of research by the Ethics Committee. In addition, participants are required to sign written consent to verify their understanding and willingness to participate in the research. Copies of the consent forms for both household participants and key informants are available in Appendix 6 and 7. Ethical approval forms were completed and approval granted by the University Ethics Committee before the start of the field data collection.

Ethics procedures had to be considered throughout the data collection process to maintain the integrity of participants and the research. The researcher avoided interviews with children or anyone below the age of 18 since the study focused on the views of adults in the home. In addition, the researcher would have had to receive a clearance from the Criminal Records Bureau (CRB) before starting the research if it involved vulnerable groups. This is in keeping with the requirements of the Northumbria research procedures (Northumbria University, 2010).

The researcher noted some vulnerable groups either lived by themselves or were on their own at the time of the data collection. They included the frail, disabled and mentally challenged. Good judgement and caution were used when vulnerable people were encountered. Good judgement was necessary as in some instances it may not be immediately obvious that an individual was mentally challenged or an older person could not hear or understand.

In recognising someone whose reasoning made them vulnerable, they were not included in the study. In such cases, the researcher ensured that people were not offended or harmed in any way. The researcher conversed with them for a few minutes before departing, so as not to leave anyone feeling disappointed. The researcher always began each encounter with a potential participant by greeting them.

3.11 Data Analysis

“Data analysis is the process of making sense of the information you have collected and searching for what lies below the surface content (Whittaker, 2009, p. 93)”. There are differences in how qualitative and quantitative data analysis is done. Quantitative data analysis looks for patterns, similarities, differences, linkages and relationships in the data. Qualitative data analysis on the other hand seeks to identify patterns, understand meaning in text generated from interviews, discussions and document analysis. The questionnaire results were coded and entered into the computer programme SPSS. This mainly included the closed questions and open-ended questions that were quantified. The programme was used to run frequencies, cross tabulations and correlations as well as generate charts and graphs.

Data from the qualitative aspects of the study was analyzed with the assistance of the computer software NVivo. The data included the open-ended questionnaire from the household survey, key informant interviews, focus group discussion and participant observation. Items were imported from Microsoft word and groups of questions so that the answers from the same questions could be analysed at the same time. Themes which emerged during the first phase of the analysis were grouped together for further analysis. The data is presented both in numerical and textual format and supported with direct quotes and photos.

Seidel (1998) summarised the purpose of qualitative data analysis as the process of noticing, collecting and thinking about interesting things. The ultimate aim of the qualitative analysis is to understand and find meaning from the data rather than quantification. Patterns and themes of multiple perspectives were highlighted and direct quotes used for emphasis.

3.12 Limitations of the Research

In relation to conducting questionnaires in communities in Windward Islands, there were a number of limitations. The presence of various researchers in the field gathering data for poverty assessments, census data and other purposes can

cause some aggravation among the population. This often resulted in the reluctance of some people to participate in the research, especially where political fallouts were obvious. The researcher was patient and pleasant at all times. This required listening at times to complaints about one political party or the other. The researcher listened without giving an opinion. In the end, most people then went ahead and answered the questionnaire.

The researcher was also mindful that the fieldwork was conducted during the hurricane season and this may have influenced responses as well as response rates. Moreover, two of the communities were affected by hurricane in the previous year and Soufrière, Saint Lucia was still in the recovery stage. The remnants of the destruction were still visible in the area. The researcher kept to the questions on the list and noted additional information without further probing so as not to influence answers or encourage reference to immediate situations.

In working with communities in the past, they are often reluctant to participate in research since there is generally little or no feedback of the results to the community. Some people expect tangible benefits when they participate in studies of this nature. Many participants ask “so what is in it for me, are you providing me with materials to fix my house?” Some people expect to receive tangible benefits for participating in the research. The researcher explained that while there were no tangible or immediate benefits, their opinions would help the researcher to address certain issues in the study which may influence future decisions. No-one was coerced into participating in the research. The researcher thanked those who listened but did not want to participate.

Conducting interviews with officials can also be problematic since these people are usually unavailable. Some simply do not wish to be interviewed and may assign a junior staff to participate. Junior employees may not be at liberty to divulge certain information, does not have access to the information and may not have the authority to give access to certain documents. It was therefore important to make appointments ahead of time and call and confirm as well as call on the day of the interview. On occasions there were long hours of waiting which created a rush on days when more than one interview were scheduled. Therefore, the

researcher ensured that interviews were not too close together as consideration also had to be made for travel time and waiting for public transport. It was a matter of keeping proper schedules and good communication with interviewees. In doing qualitative research, it is possible for the researcher to misinterpret responses and convey a message different to that of the interviewee. Clarification and verification with interviewees helped to eliminate such bias.

3.13 Conclusion

This chapter has described the research philosophy and methodology used to investigate aspects of vulnerability to hazards at the household, community and institutional levels. Due to the multidimensional nature of the study, different approaches were used to discover and understand levels of vulnerability and factors affecting vulnerability. The research also explored how people coped and dealt with the imminent danger posed by hazards as well as mechanisms within communities that fostered coping.

A mixed method research approach was considered as appropriate to achieve the research aim and objectives. This approach defied the predominant conventional views of research philosophy, which claims that opposing ontology, epistemology and methodology are incompatible in a single research.

CHAPTER FOUR

"The advantage of economic growth is not that wealth increases happiness, but that it increases the range of human choice."
(Lewis, 1955, pp.420 - 421).

4 SIDS: The Caribbean and the Windward Islands

4.1 Introduction

This chapter presents a theory of island vulnerability as well as an overview of the challenges facing Small Island Developing States as they work towards achieving sustainable development goals. This is examined in the general context of SIDS, the Caribbean Region and the Anglophone Windward Islands study area. The islands include Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines. The chapter then focuses on profiling the study areas in terms of the physical and socio economic settings, which characterise each island. A brief overview of hazards is given since this is addressed in more details in the findings. The disaster management structure in each island is discussed and the communities in which the fieldwork was undertaken are presented.

4.2 Theory of Island Vulnerability

Empirical observations from island ecology suggest that larger islands tend to have a bigger population than smaller islands. This, however, is untrue of human populations where the combined population density of the Windward Islands is greater than that of the largest Caribbean island of Cuba (102 versus 202 persons per km square). High population density on small land area is a factor which exacerbates vulnerability on islands. There is, however, rarely equilibrium in island ecosystems as intensity of occupation, duration of occupation, frequency and extent of meta-disturbance and seasonality generate non-equilibrium conditions for all populations (Gerlach, 2008). Smaller islands tend to have higher biodiversity at the borders. Similarly, smaller islands tend to have more development and settlement along the coast suggesting that more are at risk to

natural hazards such as tropical storm or tsunami which could have a disproportionate effect.

The central claim to island ecology is that the particular ecological niches give rise to greater diversity (speciation) generating 30 per cent of global biological diversity and 50 per cent of all marine life forms (Paulay, 1994). Island ecology gives some insight into Island Vulnerability, particularly the ideas of non-equilibrium conditions and greater exposure proportional to smallness, but more is needed not least because, in terms of human occupancy, there is no equivalent of speciation. A central tenet of this thesis is that there is little differentiation in the Windward Islands' economies so much so that there is little diversity. This lack of diversity underpins the idea of island vulnerability on a human social scale, Table 4.1.

Table 4.1: Island vulnerability

Dominant paradigm	Outcome	Driver	Island Size	Population dynamics	System disturbance	Vulnerability
Ecological	Speciation	Diversity	Relevant	Climax succession	Natural forces	Primary producers
Macro-economic	Monoculture	Oligopoly	Irrelevant	Outmigration	Monetary loadings	Poor people
Micro-economic	Wage Opportunity	Self Employment	Largely irrelevant	Rural to urban migration	Livelihoods	Lack of Social capital

Source: Author

Lewis (1990) has pursued a non-disciplinary inquiry into island vulnerability, one that has been taken up by others researchers (Briuglio, 1993; Pelling and Uitto, 2001; Boruff and Cutter, 2007). The first question is "Why study islands?" Some researchers seem to agree it is not the physical geography per se because different islands have different geological origins but the physical and social properties of separateness and remoteness.

The second question is "Why vulnerability?" The disproportionate vulnerability of small island states to natural hazards was demonstrated by Briguglio (1993) who, combining data on export dependence, insularity and remoteness and proneness

to natural disaster, concluded that nine out of the ten most vulnerable states were islands. Pelling and Uitto (2001) compiled a more detail analysis of over 20 island states, including the Windward Islands, using a compound index of vulnerability indicators, namely human development indices, debt service ratio, health expenditure, adult literacy, and income. This index places the Windward Islands midway in the Island Vulnerability league. Table 4.2, the index adapted from Pelling and Uitto (2001) shows the values for the Windward Islands compared with Bahamas in a more well off island with Haiti at the other extreme. In relation to the Caribbean, the Windward Islands can be considered midway on the vulnerability index using the indicators in Table 4.2 and 4.3. However there is very little variation in vulnerability between the four Windward Islands in the study. The results are quite similar when the same indicators with more current statistics are used to compare the Windward Islands, Haiti and Bahamas, Table 4.3.

Table 4.2: Vulnerability Indicators for Windward Islands, Haiti and Bahamas 1997 -1999.

Country	Human Development index (1999)	Debt service ratio (1997)	Public expenditure on health as % of GDP (1997)	Adult literacy (1997)	GDP per capita (1997)	Compound indicator
Bahamas	4	-	2	4	-	3.3
Haiti	1	2	1	-	1	1.25
Dominica	3	3	3	-	2	2.75
Grenada	3	3	2	-	2	2.5
Saint Lucia	3	4	2	-	2	2.75
SVG	3	3	3	-	2	2.75

Source: Adapted from Pelling and Uitto (2001)

Table 4.3: Vulnerability Indicators for the Windward Islands, Haiti and Bahamas 2009 - 2011.

Country	Human development index(2011)	Debt service ratio (2009)	Public exp. on health as per cent of GDP (2010)	Adult literacy (2011)	GDP per capita (2011)	Compound indicator
Bahamas	1	-	4	-	1	2.0
Haiti	6	5	6	1	6	4.0
Dominica	3	3	2	-	2	2.5
Grenada	2	3	5	-	3	3.3
Saint Lucia	5	2	1	-	5	3.3
SVG	4	1	3	-	4	3.0

Source: Adapted from Pelling and Uitto (2001)

Island vulnerability is essentially a macroeconomic concept, shaped by imbalances in economic and infrastructural development. Island economies tend to be dominated by three sectors namely agriculture, tourism and banking. Agriculture is usually monoculture, in the Windward Island bananas are subject to the vagaries of international trading agreements. Tourism is dependent on the stability of the developed world economy. Banking, and other financial regulation, is again dependent on external regulations. In short, the economies are not much under the control of island governments but the states are expected to manage their economies to reduce the pressure of global financial shocks.

Infrastructure generates a different set of problems which are a combination of the dominance of a single urban settlement, without much land use planning and a well-connected transportation network. This infrastructure is particularly at risk from landslides and floods. The uniqueness of islands has given rise to a globally recognised group with special conditions which are a threat to their sustainable development. The group of Small Island Developing States (SIDS) are by nature vulnerable to natural as well as human elements.

Vulnerability analysis on the ground is essentially a micro-economic effort focusing on the construction and destruction of livelihoods. It is essentially about generating wage, or cash, opportunity at household level. It's largely driven by the issue of self-employment. The size of the island is largely irrelevant because what is more important is the size of the local market. The critical factor in terms of population dynamics is rural to urban migration, because, beyond the family farm, towns are seen to be a better opportunity for income generation than rural areas. Disasters, however, disrupt livelihood opportunity, frequently producing a reverse urban to rural migration as food and water are usually available as "free goods" in the rural areas. Frequently the poor people move first because they have little property to protect in the towns. The demand post disaster at a micro-economic level from people hit by the disaster is usually for family shelter. The response at a macro-economic level is usually to rehabilitate infrastructure, initially transport and communications and, thereafter, other public services such as water provision. Micro demands are usually not met by macro responses.

4.3 Small Island Developing States (SIDS)

Disasters threaten the sustainable development of Small Island Developing States (SIDS) such as those in the Caribbean. SIDS are small islands and coastal low-lying communities facing similar social, economic and environmental challenges (UN-OHRLLS, no date). SIDS are different in many ways but face similar development concerns based on their small physical size, social processes, economy, topography, access to resources and hazard exposure. Notably there is a large variation in land mass from the smallest to the largest. Similar variations also exist in population size from a few thousands to millions and in terms of economic wealth and development.

The social vulnerabilities of SIDS include high population density, which puts pressure on a few limited resources. These limited resources are often over used and are at risk of being depleted at a faster than normal rate. In addition, there is limited institutional capacity, which is constrained by high migration of skilled human resources (UN, 1994).

SIDS economic limitations are a result of their smallness, geographical dispersion and remoteness as well as their dependence on a narrow range of crops and services. These income sources are subject to international trade liberalisation and unstable market conditions, which affect prices and production. Their domestic markets are too small to support economies of scale and the volume of exports is limited, which result in high transportation costs and limited competitiveness (UWICED, 2002).

SIDS ecosystems are fragile and there are concerns about the availability of fresh water and protection of biodiversity. The vulnerability of SIDS is compounded by their exposure to a wide range of natural hazards. Such challenges set back social and economic development and reduce the ability of SIDS to achieve sustainable development goals (Briguglio, 1995; Davis,1996; UWICED, 2002). Some characteristics of such islands can be considered as assets that are beneficial in addressing some of the problems communities face.

Kelman (2007) noted that:-

> ...characteristics such as tight kinship networks, unique heritage and a strong sense of identity, produce closely-knit communities with sustainable livelihoods. Remittances from islander diaspora's and circulatory migration between islands and the mainland often boost this [capacity] (Kelman, 2007, p. 1).

These capacities, if carefully assessed and developed, can help to enhance the sustainability of SIDS.

SIDS comprise some 52 countries spread across three sub-regions in the tropics and low latitude subtropics (Kelman and West, 2009). These include the Caribbean, the Pacific Ocean and the African, Indian Ocean, Mediterranean and South China Seas (AIMS). Table 4.5 shows that the Caribbean region has the largest number of SIDS, followed by the Pacific region.

SIDS work together on climate change through the Alliance of Small Island States (AOSIS) which was formalised in 1990 at the Second World Climate Conference in Geneva (Davis, 1996). AOSIS consist of about 44 members and observers, but not all SIDS are members of this Alliance (AOSIS, 2009). AOSIS ensures that the SIDS issues are voiced and negotiated internationally for a commitment on issues specifically related to climate change and sustainable development for SIDS (AOSIS, no date).

The United Nations Conference on Environment and Development held in 1992 formally endorsed SIDS as having special circumstances, which hinder the achievement of sustainable development goals. This support was reflected in Chapter 17 G. of Agenda 21, which outlined the commitment to reducing their social, economic and environment vulnerability of SIDS (United Nations, 1992).

Table 4.4: Small island Developing States (SIDS)

Caribbean SIDS			
1.	Anguilla ▪	13.	Haiti * •
2.	Antigua and Barbuda •	14.	Jamaica •
3.	Aruba ▪	15.	Montserrat ▪
4.	Bahamas •	16.	Netherlands Antilles ▪
5.	Barbados •	17.	Puerto Rico ▪
6.	Belize •	18.	St. Kitts and Nevis •
7.	British Virgin Islands ▪	19.	Saint. Lucia •
8.	Cuba •	20.	St. Vincent and the Grenadines •
9.	Dominica •	21.	Suriname •
10.	Dominican Republic •	22.	Trinidad and Tobago •
11.	Grenada •	23.	U.S. Virgin Islands ▪
12.	Guyana •		
Pacific SIDS			
1.	American Samoa ▪	11.	New Calendonia ▪
2.	Commonwealth of Northern Marianas ▪	12.	Samoa *•
3.	Cook Islands ▪	13.	Nauru •
4.	Federated States of Micronesia •	14.	Papua New Guinea •
5.	Fiji •	15.	Solomon Islands*•
6.	French Polynesia ▪	16.	Palau •
7.	Guam ▪	17.	Tuvalu * •
8.	Kiribati * •	18.	Timor-Lesté * •
9.	Marshall Islands •	19.	Tonga •
10.	Niue ▪	20.	Vanuatu * •
African, Indian Ocean Mediterranean and South China Seas (AIMS) SIDS			
1.	Bahrain •	6.	Mauritius •
2.	Cape Verde * •	7.	São Tomé and Principe * •
3.	Comoros * •	8.	Singapore •
4.	Guinea-Bissau * •	9.	Seychelles •
5.	Maldives * •		
*LDCs (12), •UN Members (38), ▪Non-UN Members/Associate Members of the Regional Commissions (14).			

Source: Adapted from SIDSNet (no date)

The first Global Conference on SIDS was convened in Bridgetown, Barbados in 1994. At this conference, further guidelines were developed to support SIDS in working towards sustainable development. The guidelines are outlined in the Barbados Programme of Action (BPoA) and calls on the local, regional and international community to take action on 15 priority areas as shown below. There is presently no priority with specific focus on people and community resilience. The focus is mainly on the natural environment and institutional capacity building.

The 15 Priority areas of the BPoA include:-

- Climate change and sea-level rise
- Natural and environmental disasters
- Management of wastes
- Coastal and marine resources
- Freshwater resources
- Land resources
- Energy resources
- Tourism resources
- Biodiversity resources
- National institutions and administrative capacity
- Regional institutions and technical cooperation
- Transport and communication
- Science and technology
- Human resource development
- Implementation, monitoring and review.

Source: United Nations, 1994

SIDS have made significant progress at addressing vulnerability in terms of policies and institutional capacity, but gaps remain to be addressed. These gaps are related to the people aspects of vulnerability and how to get people to reduce risk rather than react to hazards after they occur. Many SIDS have ratified several international conventions in particular, the Framework Convention on Climate Change, the Convention on Biological Diversity and the Law of the Sea Convention (Payet, 2008). "SIDS countries, however, are sometimes constrained by weak institutions and administrative processes and need enhanced human, technical, and financial resources to develop and implement cross-cutting approaches to the planning and management of oceans and coasts" (Payet, 2008, p.iii).

The 10 year review of the BPoA held in Mauritius in 2005 reported that progress had been made in relation to coastal and marine resources but challenges still existed in terms of the Exclusive Economic Zone (EEZ), integration of coastal and

ocean management and coastal legislation (Payet, 2008). The marine environment is critical to SIDS as most depend on marine resources, which are limited and over exploited (McConney et al., 2003). The review concluded with renewed commitment to implement the BPoA outlined in the Mauritius Strategy (Payet, 2008). The meeting also resulted in cooperation between five educational institutions in SIDS; the Universities of Malta, Mauritius, South Pacific, Virgin Islands and the West Indies. The aim is to advance education on SIDS and support the implementation of the BPoA and the Mauritius Strategy.

Climate change impedes efforts to achieve sustainable development and is likely to have serious negative impacts on SIDS, such as the Caribbean (AOSIS 2009, UNESCO 2010). These negative impacts increase vulnerability to hazards in the region especially for the poor whose livelihoods are embedded in the use of the natural resources of the sea and land. Some of these negative impacts of climate change include:-

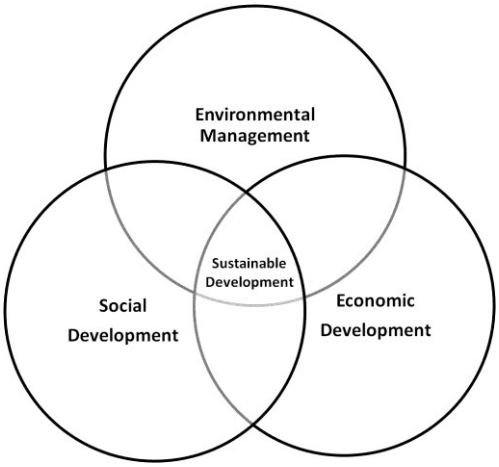
- Rapid sea level rise to increase erosion rates.
- Loss of highly valuable coastal ecosystems such as mangroves and coral reefs which will be at risk.
- Inundation of coastal development.
- Salt-water intrusion into fresh water aquifers, reducing the quality and quantity of fresh water available.
- Soil salinisation on low lying islands such as Antigua and Bahamas.
- Changes in rainfall patterns will affect agricultural production and food security in many islands as well as reduce the amount of surface water available.
- Increase in the occurrence of vector borne diseases such as dengue fever.
- Cause possible heat stress and related illnesses.
- Increase frequency and intensity of tropical storms and related events.

(UNESCO 2010, UNFCCC 2007)

There have been some collaborative efforts to address climate change, spearheaded by the UNFCCC through the Global Environment Facility (GEF) focussing mainly on adaptation (UNFCCC, 2007). These measures include the strengthening of institutions, policy and regulations, water storage capacity and agricultural management initiatives (UNFCCC, 2007). The Caribbean Community

Climate Change Centre (CCCCC) coordinates the regional agenda to address issues related to climate change. The centre helps to develop policies and projects to guide national authorities in finding effective solutions to the environmental impacts of climate change and global warming (CCCCC, n.d.). Efforts to address climate change will also contribute to sustainable development and build resilience to disasters. Sustainable development should aim to balance social, economic and environmental development. Figure 4.1 shows the linkage between environment, economic development and social development. Managing the environment while promoting economic development and at the same time addressing social development will help to promote sustainable development.

Figure 4.1: Sustainable development linkage



Source: Adapted from Adams (2006)

To make development sustainable issues of vulnerability and capacity need to be addressed in disaster planning. In communities affected by hurricanes people rebuild in the same place without reinforcement (UNECLAC, 2005). Herrmann et al. (2004) suggest that "A prohibition from building in certain places must be complemented by, for example, adequate support for building materials, job creation and diversification" (Herrmann et al., 2004). In Grenada despite being encouraged to rebuild to higher standards, people rebuilt to the same standards that were used before hurricane Ivan (World Bank, 2005). Without linking the social to the environmental and economic processes, SIDS will continue to face even more challenges in promoting and achieving sustainable development.

Lewis (2009, pp. 10-11) states clearly that "Derivative and recurrent vulnerabilities to natural hazards will reduce when they are recognized as long term processes

and when appropriate mechanism for their amelioration are made as an integral part of island development programmes". Development programmes should incorporate tools for SIDS to measure social, economic and environmental sustainability to effectively address SIDS vulnerabilities. This will provide a better understanding and proper communication of the differential vulnerability of each State" (UWICED 2002). The Caribbean SIDS have focused mainly on three main areas of vulnerability which include coastal and marine resources, natural environment and disaster management and land restriction and waste management (Ghina, 2003).

4.4 The Caribbean

The Caribbean region, with its diverse historical experiences and island characteristics is vulnerable to a wide range of hazards. Island characteristics contribute to a high and growing concentration of population in the major cities and in coastal communities of most Caribbean States. Growing cities increase vulnerability as city congestion complicates evacuation, planning and risk reduction initiatives. Shelter capacity is also limited and cities lack the social closeness and cohesiveness of rural communities. In small rural villages, most people are related to their neighbours or have close relationships with them. This is a feature of small island communities as noted earlier in this chapter. Further, a large proportion of the population of the Caribbean have migrated to coastal areas that are prone to numerous hazards. Consequently, most economic activities also occur in close proximity to the coast (Collymore, 2011). Many small islanders depend on coastal resources for economic development, in particular tourism, transport services and fishing. Agriculture is the other key economic sector in many Caribbean Islands. The agricultural sector has been in decline, but is still an important income-generating sector. Many islands are shifting towards tourism, which is also subject to the effects of natural hazards and fluctuations in visitor numbers and income generation.

The Caribbean way of life is influenced significantly by the colonial past. Most of the islands are independent but successive governments have done little to diversify the economy of some island states. The private sector in many islands

remain undeveloped and political powers result in skewed development concentrated in small, crowded and often coastal cities. “The colonisation, settlement and resettlement of the Caribbean played a role in the un-development and underdevelopment of the region” (Potter et al., 2004, p. 49). The Caribbean region shares a heritage of being colonised by the French, Spanish, Dutch and British with some islands changing hands several times. The arrival of European rulers and later the importation of African slaves altered the physical, social and cultural landscape of the Caribbean region. They reduced and dispersed the population of the indigenous people, many of whom died from the introduction of new diseases. Some retreated to remote areas of the islands, while others died in fierce battles as noted in section 2.5.1.

Aside from the socio-cultural diversity, the removal of the natural vegetation for agriculture, mainly sugar cane, represents a major change in the landscape and possibly long-term environmental degradation of many islands. Lewis and Kelman (2010) highlighted the significance of history in contributing to long-term vulnerability. The historical influences of the Caribbean region contributed to their vulnerability, adding to those already existing due to their islandness. The influences of the historical era can be characterised by a number of factors, which include migration patterns, settlement patterns, economic activities, socio-cultural and political structures, land ownership and allocation.

The shifting migration patterns in the Caribbean contributed to the vulnerability of the region in the past and still do so presently. The islands encountered challenges to the economic and social sectors from hazards, and economic down turn in the developed world in the 1880’s. Many of the wealthy and merchant class took the easy way out and migrated to islands that were doing better or USA and Europe. The emigration pattern from the Caribbean region shifted several times from different social groups in society. Initially it was the wealthier that left to avoid hardship and sent off their children to get a better education than what the islands could afford to offer.

> *Emigration to the colonial mother country for the more privileged elite classes was always an option, and sons and daughters were duly*

shipped off to the more educated in European institutions, as befitting of their social station in life (Potter et al. 2004, p.57).

Emigration then became a livelihood strategy for the poor who were able to get short term labour contracts to work on sugar plantations and other projects in central and South America and the more flourishing islands such as Cuba and Dominica Republic. These opportunities also created a certain level of vulnerability in the region as they catered mainly for men and a small group of women. Aside from the gendered vulnerability there was the breakup of the family structure and even where there was the eventual repatriation this resulted in further unemployment and deprivation especially in the smaller islands of the Caribbean.

In the early 1950s many people from the British West Indies grasped the opportunities that were being offered in the UK mainly by the British Transport and health services. There were also opportunities for further education. These opportunities were taken up by persons from all classes in the society. People left the islands in large masses which resulted in the depopulation in some of the leeward and windward islands. Migration to the UK slowed down in the 1960s but picked up in the USA and Canada mainly due to changes in immigration policies in the UK. These countries eventually tightened their immigration policies starting with the USA and, more recently in 2012, Canada. Immigration policies today favour more skilled and educated persons from the Caribbean which both reduces and increases vulnerability (Julca and Oliver, 2010).

Emigration from the Caribbean and other SIDS has both negative and positive influences (Potter et al, 2004, Julca and Oliver, 2010). The islands benefit economically through remittances from many islanders overseas. Remittances have contributed significantly to the GDP of SIDS as evident in the 2006 data which shows 42% for Tonga, 31% for Grenada and over 20% contribution to SVG, Haiti and Samoa (IADB-IFAD, 2007, World Bank, 2006). Remittances contribute to poverty reduction in some families and communities in particular those with limited economic opportunities. Remittances also contribute to overall reduction in national poverty. The return of migrants with increase human capital to work in the

region also contributes to socioeconomic growth and national output (Julca and Oliver, 2010).

Presently the immigration policies in developed countries are friendlier towards highly skilled people. Therefore many skilled people leave developing states to find better jobs and pay to match their qualifications. This reduces technical capacity in small developing states and results in a “brain drain” and a lack of capacity of technical skills to regulate development in high risk areas and regulation of land use and development planning. There is also a breakdown in family ties, loss of potential community leaders, increase inequality, loss of production and socioeconomic return of public investment. Remittances can create vulnerability by increasing the dependence while causing a neglect of livelihoods. A fall off in remittances can contribute to decrease economic activity and result in increase poverty. In addition remittances from developed countries similar to agriculture and tourism are subject to economic shocks in these countries.

The dominance of agriculture as a main economic sector increases the vulnerability of the Windward Islands States. This is aggravated by the dependence on a single crop such as bananas or a few crops, cocoa, nutmegs, and bananas in the case of Grenada. Productivity is influenced by natural hazards and pest and diseases which can destroy entire crops. There is also the influence of international trade agreements which result in a low market price and off balanced by high cost of production locally.

The Windward Islands have been involved in banana production for export to Britain from around the 1950’s as a viable economic means. The islands were struggling economically and previous efforts at banana trade with Canada had been halted after being plagued with diseases, local problems and competition from Jamaica and other trading issues (Clegg, 2000). The trade was supported by preferential treatment to UK markets which was set up for colonies and to former colonies after independence which was 1979 for the last of the Windward Islands. The preferential treatment placed tariffs and quotas on non-ACP or dollar bananas from Latin American which could be produced extensively at a cheaper cost than

in the Windward Islands. Clegg (2000) noted that the UK government contributed significantly to the development of the banana industry in the Windward Islands to boost the development of the industry. This included grants and loans to import banana suckers, create nurseries, disease control, fertilisers and training agricultural officers.

In the Windward Islands bananas are generally grown on small plots of lands usually between two to 10 acres. As noted throughout this study the Windward Islands are generally mountainous with very little flat lands which mean that farming is generally on steep hill slopes and narrow valleys. In addition, production is affected by drought as well as too rainfall extremes. Transportation cost is high to facilitate stops at multiple ports between the Windward Islands (Torgerson 2010). In contrast competitors from Latin American cultivate on generally flat and large plantations with higher yields and much cheaper labour costs (Torgerson 2010). This makes it difficult for the Windward Islands to compete on the global market and affect the economic status of the small farmers.

The preferential access of Windward Islands bananas to the UK market was eliminated in the 1990's by the WTO ruling based on disputes between the EU and US. This caused a rapid decline in bananas production in the islands and some farmers left the trade completely (Torgerson, 2010). Those who stayed in banana production had to turn to fair trade as a means of survival (Torgerson, 2010). Banana farming is still very important to the economy of the Windward Island which only contributes about 1 per cent of the global banana trade but employs a significant proportion of the labour force of small states. The economic fallout was significant for many in the Windward Islands and small farmers. Fairtrade (2012) reported that:-

> *The banana trade traditionally provided a direct living for thousands of small-scale producers, account for up to 50% of the Windward Islands' total export revenue. But since the introduction of the EU regime, annual banana exports have fallen from 274, 000 tonnes in 1992 to 82,000 tonnes in 2009, while their value correspondingly shank from US$147m to US$45. (Fairtrade, 2012, p.2)*

The decline in the banana industry has left both farmers and islands states dependent on the banana trade more vulnerable as a result of reduced income. Many of the present day struggles in the banana trade are similar to those which existed at the beginning of the industry including trade issues, pest and diseases and natural hazards. The challenges increase the vulnerability of those farmers who depend on bananas for a weekly income which means that any interruptions and changes will have a long term negative impact on farmers and their dependents. It has been suggested that the problems faced in the banana industry was instrumental in the increase in the shift from legal agriculture to the illegal cultivation of marijuana which Myers (2004) suggest contributes significantly to the mainstay in some Caribbean islands. Improving the resilience of the agricultural systems is a key for the reduction of vulnerability of livelihood especially that of the poor and a reduction in overall vulnerability.

Alexander (2000) suggest that it would be best to avoid hazard prone areas completely however the settlement and land use history of the Caribbean region already contribute to the vulnerability of people and their livelihoods. Alexander (2000) further states that vulnerability is exacerbated by land use decisions. These decisions include the development of coastal areas that historically ensured control and security of the islands. Most inland areas were undeveloped as roads and infrastructure development took place along the coastal plains. The trend continued in many islands, even after independence. Economic activities are also concentrated on the coast, including tourism development, transport and trade services and fishing villages. In addition, there has been the draining of wet-lands, reclamation of land from the sea and sand mining as well as the destruction of coral reefs to expand along the coast. This has resulted in over-exploitation of the coastal environment and the destruction of the natural buffers, thus exposing inland areas to coastal hazards and flooding.

People who cannot afford to settle along the coast opt for hillsides, often squatting on government lands without the necessary regulations and guidance to support such developments. People who occupy lands illegally often do not use building codes (Manuel-Navarrette, Gómez and Gallopín, 2007). Riverbanks and flood plains have become useful for domestic and livelihood activities, so settlements

thrive along these areas (SEDU, 2008). In addition to that some squatters encroach on forest reserves such as the King's Hill Forest in St Vincent contributing to deforestation and land degradation and increase vulnerability in surrounding communities.

People are aware of the hazards they face but they make their choices based on personal needs (Kelman, 2011). People want to have their own homes and they will build where they can afford to build, with whatever materials they can afford. They are putting themselves at risk but they fulfil their greater need rather than design for disasters that they think may never happen.

While disasters are detrimental, they also provide opportunities to make changes and improvements for future events. However, based on observations some interventions from friendly governments are not built to standard and are not culturally suitable to the local population. As noted before many governments in the Caribbean have implemented land reform programmes over the years but some of the programmes are not consistent and face many challenges. The challenges include fragmentation because of family land ownership, poor land use policies and management, changes in political power and priorities of the government in power and squatting mainly on government lands.

Smallness need not be a disadvantage; it can be an advantage towards developing sustainable communities. There is already a level of cohesion in many communities in the Caribbean, which can support community risk reduction programmes. However, measures should be put in place to capitalise and build on this cohesion, to empower communities with skills and knowledge to reduce risk and vulnerability and build community resilience. Empowering communities would need to coincide with strategies to reduce poverty, improve livelihoods, education and enhancing the socio economic challenges that people encounter.

4.5 Hazards and Disasters in the Caribbean

The Caribbean region is regarded as the second most disaster prone region in the world. The Caribbean is at risk to hurricanes and storms, floods, landslides, earthquakes, tsunamis, volcanic eruption, drought oil spills and fires (Amad, 2007;

Collymore, 2000; Poncelet, 1997). The most frequent hazards include hurricanes and storms, floods and landslide. Damage from hazards in the Caribbean is frequent and losses are greater in the social and productive sectors (Collymore, 2011). Hurricanes and storms cause more damage than other hazards. The designated hurricane period for the Atlantic area is from 1st June to November 30th (NOAA, no date) but there have been occurrences outside of this period. Research has shown that the frequency and severity of hurricanes and storms are increasing, so too is the associated loss of lives and economic cost of these systems (UNIDSR, 2011).

Hazards, in addition to the persistent "development in high-risk areas, lack of adherence to building codes and use of substandard materials, high levels of poverty, socio-economic exclusion and environmental degradation" increase the vulnerability of Caribbean people (Amad, 2007, p.18). Consequently the main sectors affected by disasters in the Caribbean are tourism, housing and agriculture (Collymore, 2000). Collymore (2000) further indicates that hospitals and schools are the critical facilities that are most affected. Vulnerability assessments conducted in several islands shows that most of the critical facilities are located a narrow coastal zone exposed to hurricanes and coastal hazards. Schools are used mainly for shelters and this places people at great risk and puts an additional burden on government. Consequently, most people are unable to rebuild on their own since they do not have or cannot access insurance. These people usually become dependent on government. Housing in the Caribbean is characterised by formal housing with minimum standard regulations and informal/squatter settlements of poorly constructed houses (Prevatt et al., 2010). It is therefore not surprising that the sector most affected by adverse events is usually the housing sector. Some examples on damage in the housing sector Windward Islands are found in Chapter 5.

Prevatt et al. (2010) attribute the housing issues to a lack of research, dissemination of existing information and limited use of mitigation strategies aimed at improving construction of houses in the Caribbean. They also suggest that there is inadequate training of construction workers and building officials and minimal inspection or enforcement of building code requirements. The growing

and high density population concentrated in already congested urban areas compounds the housing problems (Pulwarty, Nurse and Trotz, 2010). Heileman and Corbin (2004, p.1) highlighted the major factors responsible for coastal degradation in the Caribbean as "population growth and poorly planned coastal urban and industrial development, indiscriminate exploitation of coastal resources, as well as inappropriate agro-forestry practices". In an attempt to reduce the risk of new developments to disasters, the Caribbean Development Bank (CDB) proposes that Natural Hazard Impact Assessment (NHIA) should be incorporated into development projects and development planning. The NHIA is designed to identify the linkage between natural hazards and new developments by conducting an assessment of the project vulnerability and risk of loss to hazards (CDB/CARICOM, 2004). The use of such assessments in new housing development can enhance the quality of houses in the Caribbean.

As noted by several researchers in Chapter 2, due to the small size of most Caribbean States, a single event can cause severe damage to entire islands. Bisek, Jones and Ornstein (2001, p.6) confirms this and add that, "The amount of damage suffered can equal or exceed the country's total annual GDP...". Notable examples include the loss from the on-going eruption of the Montserrat volcano from 1995 and hurricanes such as Gilbert 1988, Hugo 1989, Debbie 1994, Luis 1995, Marilyn 1995, Georges 1998 and Lenny 1999 (Bisek, Jones and Ornstein, 2001). More recently, hurricanes Ivan 2004 and Tomas 2010 and the Haiti earthquake in 2010 have caused serious economic setback in the Caribbean.

The Caribbean Institute of Meteorology and Hydrology (CIMH) issued drought alerts for the Eastern Caribbean from October 2009 to January 2010. The affected area stretched from Dominica to Guyana and experienced moderate to extremely dry conditions over the four months (Farrell, Trotman and Cox, 2010). Saint Lucia, Barbados, St Vincent and the Grenadines and Grenada were seriously affected, water levels dropped and States had to limit the availability of water and impose water restrictions for the public during the peak of the dry season. The drought resulted in an increase in bush fires, reduction in hydroelectric power and affected agriculture in various islands (Farrell, Trotman and Cox, 2010). These well-publicised events get the attention of policy makers,

international agencies and NGOs. Smaller events generally go unattended. However, the overall damage caused by small events can have a huge impact on developing countries as much as larger events. Failure to address small-scale events increases the vulnerability of a place and makes way for future disasters.

The vulnerability of island states and territories of the Caribbean was re-emphasised in 2004 when hurricanes, floods and earthquakes resulted in losses of almost US $4 billion. The devastation caused by the disasters highlighted the importance of the Caribbean Comprehensive Disaster Management (CDM) adopted in 2001. An assessment of the CDM framework at the end of the first 5-year period led to improvements that were necessary for the period 2007 to 2012. The revised CDM strategy is discussed further in the next section and a copy is found in Appendix 8. The assessment indicated the need for more investment in the Community Disaster Management agenda. The level of progress in disaster management in the in the Caribbean region varies. Some countries are preoccupied with addressing more current and conspicuous problems such as employment, poverty and inadequate housing and health services. Some islands also possess better resources and have a longer history of capturing data than others (Collymore, 2000).

4.6 Disaster Risk Reduction in the Caribbean

4.6.1 Caribbean Comprehensive Disaster Management (CDM)

The Caribbean Disaster Emergency Management Agency (CDEMA) coordinates the regional risk reduction agenda in the Caribbean in collaboration with 18 participating states. The regional mechanism developed out of concerns raised by a regional conference of Health Ministers and strengthened by floods and hurricane events in 1979 and 1980 (Poncelet, 1997).

To address this concern the Disaster Preparedness Programme was established in 1981 to provide regional assistance to Caribbean States in developing preparedness organisations (Poncelet, 1997). Support for that programme emanated from various agencies such as PAHO, Red Cross, UNDRO, CARICOM,

OFDA, ODA and CIDA. The programme was later renamed the Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP). This rebranding represented a shift from focussing on relief and response to more focus on prevention. Amidst the constant devastation of many islands, there was the realisation by policy makers, that there is the need for a more systematic approach to hazards. The decision was made by the head of CARICOM states to make provision for the formation of CDERA in 1991 (Poncelet, 1997). The new agency with a wider scope than the PCDPPP was funded by member states with support from donors. While the focus was mainly on coordinating responses to support member states and has evolved since its inception.

In 2001, after consultation with multiple stakeholders, CDERA adopted a strategy and results framework for CDM in the Caribbean region. The framework was based on disaster loss reduction and creating an enabling environment with the aim of linking CDM to development. The goal of the strategy was to promote sustainable development in the Caribbean. The strategic objective was designed so that CDM would be integrated into the development processes of the Participating States (CDERA, 2005). The CDM mechanism has been instrumental in the Caribbean, emerging out of a culture of reacting to the occasional hurricanes to focussing on reducing risk to all hazards.

The focus of CDM is to embrace all people in society and incorporate key sectors such as health, nutrition, education, tourism and agriculture. Support for disaster management in the region has come in many forms from international government and various organisations, either to individual countries or through the regional mechanism. The support varies from consultancy, financial support, training, technical support and scholarships. These efforts have assisted with the implementation of DRR in the region but require much more support to strengthen the process and ensure it becomes a part of national agendas and community development. The area of community DRR calls for greater collaboration between the community and policy makers.

The region has advanced significantly over the last 20 years in terms of disaster management but there are still many gaps. There is now a more proactive

approach stimulated by the International Decade for Natural Disaster Reduction (IDNDR), an increase in disaster events throughout the region and the uncertainty about the implications of climate change. On September 1, 2009, CDERA underwent transformation from CDERA to CDEMA as it began to promote a holistic approach to DRR through the Comprehensive Disaster Management (CDM) framework. The number of participating states increased from 16 to 18 with the two newest members being Haiti and Suriname.

The CDEMA participating states are divided into four sub- regions with one state, referred to as the focal point, having overall responsibility for that sub-region. The sub-regions and focal point are shown in Table 4.5. The aim of the regional sub-division is to better support the coordination of responses of affected states through the focal point.

Table 4.5: The Sub Regions of CDEMA Participating States

Focal Point	**Members of each Sub Region**			
Antigua	Anguilla	Virgin Islands	Montserrat	St. Kitts
Barbados	**Saint Lucia**	**Dominica**	**St Vincent and the Grenadines**	
Jamaica	Bahamas	Belize	Turks & Caicos	Haiti
Trinidad & Tobago	**Grenada**	Guyana	Suriname	

Source: CDERA 2007

This subdivision has the potential to improve regional coordination and enhance DRR capacity in the Caribbean. However, the capacity of sub regional focal points needs to be developed further to support and collaborate with members in their sub region. Each member state also needs to enhance their disaster management capacity since focal point and members of the same sub-region can all be impacted by a single event. In the past, storms that have affected Barbados, Saint Lucia, Dominica and St Vincent and the Grenadines, all part of the same sub-region.

CDEMA has an expanded mandate, a broader stakeholder base and an improved governance structure. The agency has fully embraced the principles and practice of CDM, an integrated approach to disaster management.

The main functions of CDEMA (2009, pp.1–3) include:-

- Mobilising and coordinating disaster relief;
- Mitigating or eliminating, as far as practicable, the immediate consequences of disasters in Participating States;
- Providing immediate and coordinated response by means of emergency disaster
- Relief to any affected Participating State;
- Securing, coordinating and providing to interested inter-governmental and nongovernmental organisations reliable and comprehensive information on disasters affecting any Participating State;
- Encouraging –
  (i) The adoption of disaster loss reduction and mitigation policies and practices at the national and regional level;
  (ii) Cooperative arrangements and mechanisms to facilitate the development of a culture of disaster loss reduction; and
- Coordinating the establishment, enhancement and maintenance of adequate emergency disaster response capabilities among the Participating States.

The governance structure consists of the Council, the Technical Action Committee (TAC) and the coordinating Unit. The Council, the supreme body of the Agency consist of the Heads of Government of Participating States or their representatives. The Council is responsible for appointing the Executive Director of the Agency. The TAC consists of the National Disaster Coordinators of all the Participating States as well as technical experts from specialised organisations in the region. The TAC is responsible for advising the agency on technical and programme issues.

The secretariat located in Barbados is the coordinating unit responsible for the execution of the agency work programme. The Executive Director is responsible for overall management of the agency. CDEMA is funded by the government of each participating state and receives donor assistance from various organisations such as the Inter-American development bank, the UNDP and cooperation from

the Austrian, Canada, United States, United Kingdom, Japan and the European Union.

The CARICOM Regional Framework 2005-2015 focuses on five (5) priority areas and include:-

- Hazard mapping and vulnerability assessment
- Flood management
- Community disaster planning
- Early warning systems
- Climate change
- Knowledge enhancement

(CDERA 2007)

The overall focus of the CDM strategy is Building the Resilience of Nations and Communities to hazard impacts. The goal of the revised CDM framework is "Regional Sustainable Development enhanced through Comprehensive Disaster Management" (CDERA 2007, p.6). The purpose is to "To strengthen regional, national and community level capacity for mitigation, management, and coordinated response to natural and technological hazards, and the effects of climate change (CDERA 2007, 6). The framework proposes four outcomes in order to achieve the purpose and ultimate goal of CDM in the Caribbean Region. The outcomes are outlined in the framework in Appendix 8.

The progress made by the CDEMA participating states in relation to risk reduction is at varying levels. All states have an organisational structure and programme in place to deal with disaster risks including new and emerging threats posed by climate change and disease epidemics. Many offices in the region still lack the capacity to integrate disaster management into overall development due to many constraints. All the disaster agencies in the regions have a budget and staff, but some budgets are quite small and staff very limited (Poncelet, 1997). Lavell (2002) noted that while the region has progressed in knowledge and research in relation to hazards, such as hurricanes, floods and seismic activity, through the University of the West Indies and the CHMI this has not been effectively transferred into community risk reduction.

The regional mechanism includes collaboration with various partners at the international, regional and national levels that contribute to the Caribbean CDM. As such, there have been many tools and initiatives with a multi-island focus, which can be adopted or designed to benefit national DRR. Two of the key initiatives are the Caribbean Catastrophe Risk Insurance Facility (CCRIF) and the Vulnerability Benchmarking Tool (BTOOL) will be discussed in the following sections.

4.6.2 Caribbean Catastrophe Risk Insurance Facility (CCRIF)

The Caribbean as a commitment to reducing risk to disasters in 2007 developed a multi-state insurance pool. "The Caribbean Catastrophe Risk Insurance Facility (CCRIF) is the first multi-country risk pool in the world, and is also the first insurance instrument to successfully develop parametric policies backed by traditional and capital markets" (CCRIF, 2011, p.3). The development of the CCRIF was initially funded by the Japanese government and subsequently by a donor trust fund. Contributors to the donor trust fund include the European Union, the World Bank, CDB and the governments of UK, France, Ireland and Bermuda. The 16 member countries also pay subscription to the fund. The members countries include Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Haiti, Jamaica, St Kitts and Nevis, Saint Lucia, St Vincent and the Grenadines, Trinidad and Tobago and the Turks and Caicos Islands (CCRIF, 2011, p.3).

The insurance covers damage by hurricanes and earthquakes. The coverage provides cash in the shortest possible time to fund recovery. The insurance fund made pay-outs the same year it was launched to Dominica and Saint Lucia following the November 2007 earthquake. Table 4.6 shows that, to date, pay-outs have been made to eight states with the latest pay-outs occurred in 2010 for the Haiti earthquake and hurricanes affecting Anguilla, Barbados, Saint Lucia and St Vincent and the Grenadines.

Table 4.6: CCRIF Payouts 2007 to 2010

Event	Country Affected	Payouts (US$)
Earthquake, 29 Nov. 2007	Dominica	582,021
Earthquake, 29 Nov. 2007	Saint Lucia	418,976
Tropical Cyclone, Ike, Sept. 2008	Turks and Caicos Islands	6,303,913
Earthquake, 12 Jan. 2010	Haiti	7,753,579
Tropical Cyclone Earl, Aug. 2010	Anguilla	4,282,733
Tropical Cyclone Tomas, Oct. 2010	Barbados	8,560,247
Tropical Cyclone Tomas, Oct. 2010	Saint Lucia	3,241,613
Tropical Cyclone Tomas, Oct.2010	St Vincent and the Grenadines	1,091,388
Total for the Period 2007 – 2012		**32, 179,470**

Source: CCRIF, 2011, p.3

4.6.3 The Vulnerability Benchmarking Tool

The Organisation of Eastern Caribbean States (OECS) benchmarking tool (BTOOL) was developed to assist the OECS to proactively plan and implement actions to reduce vulnerability to natural disasters and greater economic resilience when they do occur (Opadeyi and Spence, 2007). The tool assesses vulnerability using six components as shown in Table 4.7. The aim of the tool is to improve the ability of national governments, civil society and the private sector to identify strengths and weaknesses and frame policies to improve weak areas. The BTOOL assesses vulnerability based on a number of components. The components include risk identification, risk mitigation, risk transfer, disaster preparedness, emergency response and rehabilitation and reconstruction. Table 4.7 provides a brief description of each component.

National assessments have been conducted since the launch of the tool. However, it is not clear to what degree the results of the assessments inform decision-making. The tool highlights the importance of multi-stakeholder partnerships and inter-agency collaboration in effectively reducing risks to disasters. The challenge is that some stakeholders pledge support but do not follow that with actions. In some instances, the capacity of responsible agencies and departments is limited and they are unable to perform their duties.

Table 4.7: BTOOL assessment components and rank for 2009

Components	Description
Risk Identification	Hazard and vulnerability assessment. Hazard monitoring and forecasting (mapping and scenario building).
Risk mitigation	Physical and engineering mitigation. Land use planning and building codes. Economic incentives for pro-mitigation behaviour. Education and training, awareness – risk and prevention.
Risk Transfer	Insurance, reinsurance, catastrophe bonds, weather index, hedge funds, safety regulations of services – water, energy, transport Calamity funds
Disaster Preparedness	Early warning and communication Contingency plans Network emergency responders Shelters and evacuation plans
Emergency Response	Humanitarian assistance, clean up, repairs, restoration of services, damage assessment, mobilisation of recovery resources
Rehabilitation and reconstruction	Macroeconomic and budget management, revitalisation of affected sectors, incorporate dim in reconstruction.

Source: Opadeyi and Spence (2007)

4.7 The Windward Islands Study Area

The Windward Islands lie to the southern end of the Eastern Caribbean Island archipelago. They include the French Territory of Martinique and the Anglophone islands of Dominica, Saint Lucia, St Vincent and the Grenadines and Grenada. The grouping excludes Barbados situated outside the arc and the more southerly Trinidad and Tobago (Encyclopaedia Britannica Online, 2012). The four English-speaking Windward Islands form the basis of this study. The islands in the study are identified in Figure 4.2.

Figure 4.2: Map of the Caribbean highlighting study areas

Source: Wikimedia

The Anglophone Windward Islands share some common political and economic patterns. They also collaborate in the trading of bananas under the Windward Islands Bananas Growers Association. Bananas are grown mainly by small farmers and have been exported to the UK since the 1950's. The Windward Islands were granted preferential access to the UK market until the 1990's. The Windward Islands are all members of the Commonwealth and have membership of a number of regional and extra-regional organisations. The organisations include the Caribbean Community (CARICOM), Caribbean Disaster Emergency Management Agency (CDEMA), Organisation of Eastern Caribbean States (OECS), Alliance of Small Island States (AOSIS), The Association of Caribbean States (ACS), Implementing Agency for Crime and Society (IMPACS) and Regional Security System (RSS), the Caribbean Institute of Meteorology and Hydrology (CIMH), the Caribbean Community Climate Change Centre (CCCCC) and the Seismic Research Centre (SRC). These organisations have been instrumental in developing the capacity of the region to address disaster risk reduction, climate change, sustainable development and related issues.

As part of the OECS, the Windward Islands share a common currency, the East Caribbean (EC) Dollar. The OECS was formed on 18 June 1981 by the signing of

a treaty by seven Eastern Caribbean countries. Through this treaty, the islands agree to co-operate with each other and promote unity and solidarity among the members. The OECS presently comprise nine member states: Antigua and Barbuda, Dominica, Grenada, Montserrat, St. Kitts and Nevis, Saint Lucia, and St. Vincent and the Grenadines. Anguilla and the British Virgin Islands are Associated Member States of the OECS (OECS, nod.).

The Windward Islands have all embraced the Caribbean CDM strategy and framework for implementation nationally. The islands also subscribe to the Caribbean Uniform Building Codes (CUBIC), which is not mandatory in any of the islands. The mountainous and volcanic nature of the Windward Islands means they are exposed to similar hazards and development problems. Common to the islands are development on hill slopes and the aggregation of settlements on coastal plains. Fieldwork was conducted in the islands between July 2011 and January 2012. This section provides a profile of each island and study area.

4.8 Commonwealth of Dominica

Dominica is the most northerly and largest (754 sq. km/290 sq. mi) of the English speaking Windward Islands as shown in Figure 4.3. It is located 15° 30′ N and 61° 25′ W between the French islands of Guadeloupe to the north and Martinique to the south. The main language is English, but a French Creole is widely spoken. Dominica is a mountainous island, with a very rugged and steep landscape making it the most mountainous of the Eastern Caribbean islands. The island has no flat lands greater than 1 sq, km. The islands consist of a series of high peaks including Morne Diablotin (4747ft/1,730m) and Morne Trois Piton (4670ft/1424m). The St Joseph study area is identified in Figure 4.3.

Figure 4.3: Map of Dominica showing study area

Source: World Atlas

Approximately 60 per cent of the island is covered by vegetation including tropical forest and scrub woodlands. The island has a rich biodiversity and one of the largest river densities in the world (Lindsay et al., 2005). Dominica has a tropical climate regulated by North East Trade Winds. Temperature ranges from 26° to 32° Celsius with a small diurnal range of about 3° Celsius. Rainfall is high and occurs mainly between June and October. Average annual rainfall range from 500 to 900 cm.

The 2011 census estimates that the population of Dominica is about 71, 293. The area with the largest population (14, 725) is the capital Roseau and its suburbs Government of the Commonwealth of Dominica, 2001). Flat lands are restricted to coastal areas therefore the majority of the population and infrastructure are

located along the coast, while the interior is sparsely populated (Government of the Commonwealth of Dominica, 2001).

The economy is still very dependent on agriculture, which is the main contributor to GDP. The main agricultural produce includes bananas, bay oil, vegetables, grapefruit, and oranges. Poverty in Dominica has reduced by about 10 per cent from 39 per cent in 2003 to 28.8 per cent in 2009 (Caribbean Development Bank, 2010). National unemployment rate is about 14 per cent but is higher for women (17.6%) than men (11%). Unemployment is also highest among the poor (29.5%). Women head about thirty seven per cent (37%) of households on the island. A high proportion of these female-headed households are poor. The average household size is four members for poor households and about two members for the non-poor households (CDB, 2010).

Dominica has one of the largest populations of older people in the world. Women mainly take on the responsibility of caring for the elderly. Dominica is the only Caribbean island with an indigenous Carib population of about 2000 inhabitants concentrated in a designated settlement. The Island gained independence from Britain on the 3rd November 1978 at which time it became a republic. The President is the head of state, but the Prime Minister and Cabinet members hold executive powers.

Dominica is vulnerable to various hazards. The island has about eight (8) potentially active volcanoes (SRC, no date). The Seismic Research Centre (SRC) monitors seismic hazards consistently. It is estimated that about 90 per cent of the population of Dominica lives within five kilometres of an active volcano (Lindsay et al., 2005). The island is also at risk to earthquakes, flooding, landslides and hurricanes. The collapse of a dam into the Layou River resulted in an ecological disaster being declared in the Layou River Valley area in July 2011 (Office of Disaster Management Dominica, 2011). The collapse resulted in damage to roads, infrastructure, agriculture and utilities. An agricultural propagation station was destroyed and 13 dwellings were affected.

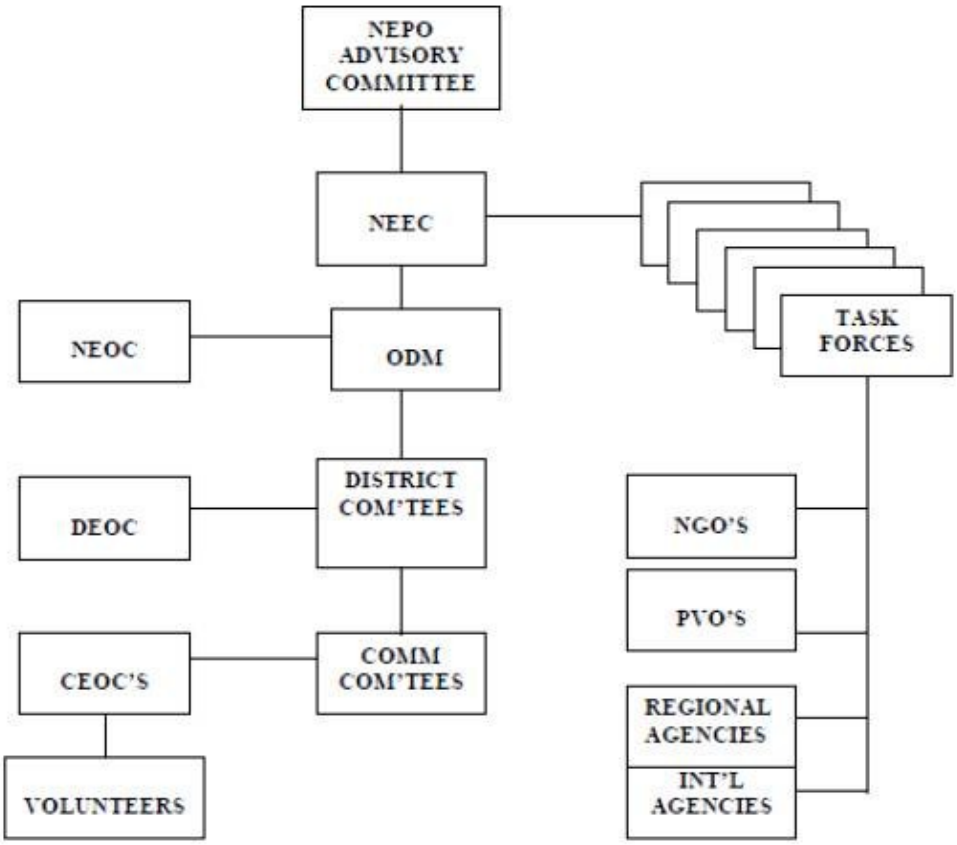
Hurricanes and related systems frequently impact Dominica. The island has been impacted by a number of hurricanes over the years, most notably in 1979 both

hurricane David and Frederick, Hurricane Allen in 1980 and hurricane Dean in 1980. Hurricane David 1979 left about 37 dead and over 5000 injured and most of the population affected (Honychurch, 1984). The island has also been affected by multiple storms in the same year, such as the 1995 impact by Luis, Iris and Marilyn. The island has been affected by consecutive storms over several years. Additional details on the hazards and disasters in Dominica are discussed in Chapter 5 and detailed in Appendix 9.

4.8.1 Disaster Management Framework in Dominica

The Dominica National Emergency Planning Organisation has overall responsible for disaster management in Dominica. The organisation consists of various stakeholders including government, NGOs, the private sector, community entities and volunteers, (Office of Disaster Management Dominica, 2001). The structure of the organisation is shown in Figure 4.4.

Figure 4.4: National Emergency Management Planning Organisation (NEPO



Source: NEPO, 2001

The highest arm of the organisation is the NEPO Advisory Council, which is chaired by the Prime Minister. The President, on the advice of the Prime Minister, has the authority to declare a national disaster or state of emergency if it becomes necessary. The Disaster Preparedness and Emergency (Disaster) Powers Act 1987 provides the legal framework for disaster management in Dominica.

The national plan (NEPO, 2001) outlines the disaster management framework for the island. The office of disaster management, which is the secretariat to NEPO, executes the daily operations under the supervision of a Director. There are two other technical staff and two supporting staff assigned to the office.

The Dominica national disaster plan outlines a detailed network of district and community mechanism to undertake disaster management. However, the reality is quite different, as the National Disaster Office is constrained by limited staff and resource capacity. Community disaster management in Dominica is the responsibility of the village councils. They are required to have a committee, led by a chairperson and other members. The committee is also expected to have several subcommittees responsible for transportation, road clearance, rehabilitation, shelter and shelter management and damage assessment.

4.8.2 Profile of the St Joseph and Layou Study Area

The fieldwork was undertaken in St Joseph, one of the 10 parishes in Dominica. It is located on the south western coast of the island. The 2011 census estimates the population of the parish at 5,637 (Government of the Commonwealth of Dominica, 2011). The study focused on the two neighbouring villages of St Joseph with a population of 1,746 and Layou with 433 (Government of the Commonwealth of Dominica, 2011).

St Joseph village is the main town for the parish. The Layou River, the longest river in Dominica, passes through and ends in the Parish of St Joseph. The old Roman Catholic Church build in the 19th century is a main feature in the village of St Joseph. The main economic activities in the area include fishing, farming and vending. There are many small corner shops and convenience stores, liquor

shops, small churches and schools. The town of St Joseph also boasts a health centre, which has been upgraded through funds from the Social Investment Fund (SIF) during the fieldwork. The village also has a police station and a secondary school which is used as an emergency shelter.

The Layou Improvement Committee is an organisation with an interest in the development of the Layou Village. Annually they organise a Titiwi Festival to raise funds for scholarship and other programmes in their small community. The festival had to be postponed in 2011 because of the ecological disaster caused by the Layou River.

4.9 Grenada Including Carriacou and Petit Martinique

The island nation of Grenada (344 sq. km/133 sq. mi) consists of three islands; mainland Grenada (307 sq. km/120 sq. mi), Carriacou (34 sq. km/13 sq. mi) and Petit Martinique (2.36 sq. km/0.9 sq. mi). Figure 4.5 shows the tri-Island State of Grenada and highlights the study area. The fieldwork for this research concentrated on the main island of Grenada. Grenada is located 12° N, 61° W and is the most southerly of the Windward Islands. The closest neighbours are St Vincent and the Grenadines to the north and Trinidad and Tobago to the south.

Figure 4.5: Map of Grenada showing study area

Source: World Atlas

Grenada is characterized by a mountainous terrain and the highest peak is Mt. St. Catherine (840 m). Grenada has a humid and tropical climate. There is a dry season from January to May and a rainy season from June to December. The average annual temperature is about 27 degrees Celsius.

The island changed hands between France and Britain before being ceded to Britain in 1783. Independence was gained from Britain on 7 February 1974. The island now has a political democratic system based on the Westminster model. The island state is led by the Prime Minister and supported by a cabinet of ministers who are elected for a maximum of 5 years. The Head of State is Her Majesty the Queen, who is represented by a Governor General.

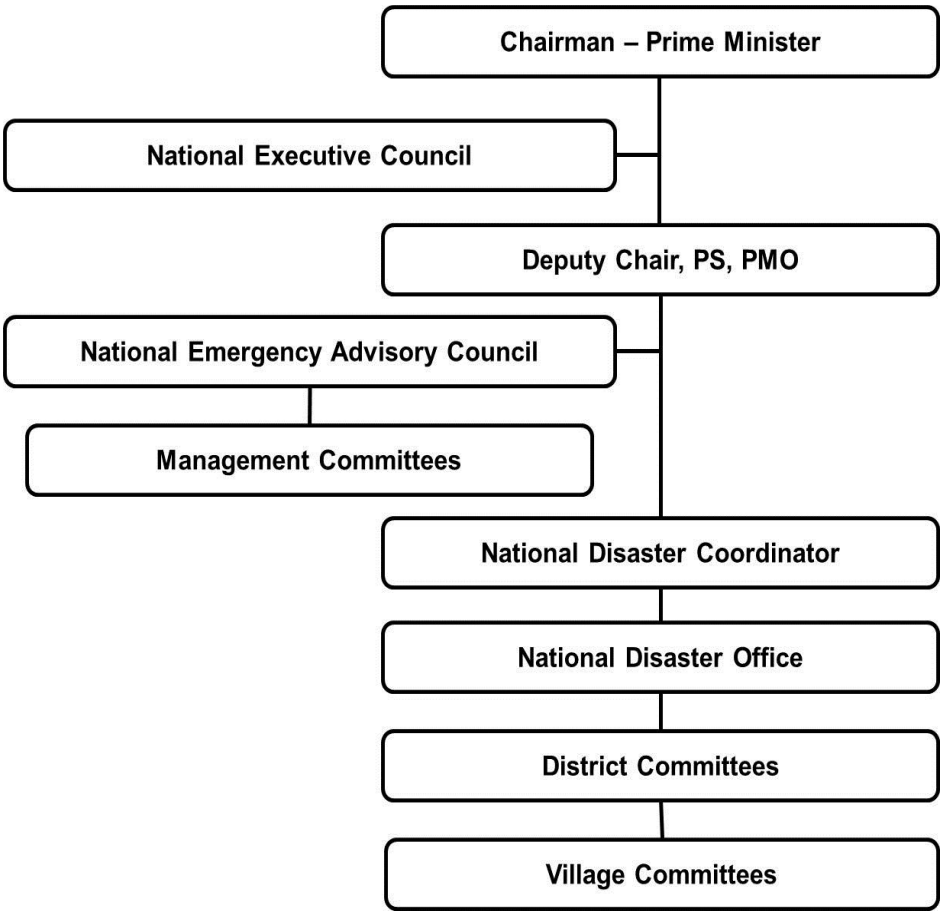
The estimated population of Grenada is approximately 103,328 (Burke, 2012). Most settlements are located in the capital St Georges and the suburban areas. The economy of Grenada is dependent on fishing, agriculture and tourism. The main agricultural products are nutmegs, mace, cocoa and bananas. The island also produces a wide range of spices, fruits, root crops and vegetables.

Grenada and its dependents are at risk to various hazards including hurricanes and storms, storm surges, landslides, volcanic eruptions, flooding, earthquakes, fires and tsunamis. The Kick em' Jenny underwater volcano is located 8 km north of Grenada and about 160 m below the water surface. The volcano has erupted 11 times since its discovery in 1939. The last eruption occurred in 1999 (SRC, no date). This volcano will likely form a new island in the future (Potter et al., 2004). Grenada has been affected by several major events in more recent years. Hurricanes Ivan (2004) and Emily (2005) caused severe destruction to the islands. Hurricane Ivan the first major impact on Grenada since 1955 and resulted in damage more than 2.5 times the annual GDP and destroyed over 90 per cent of the buildings on the island (OECS, 2004). The nutmeg industry, on which about 30,720 people were dependent, was seriously affected. The tourism sector, which accounted or 26 per cent of total employment was disrupted and many hotel rooms were closed as arrivals dropped (OECS 2004). Many jobs were lost as all the key economic sectors were affected including tourism and agriculture (OECS 2004). More details can be found in the hazard profile in the Appendix 9.

4.9.1 Disaster Management Framework in Grenada

The National Disaster Management Advisory Council (NaDMAC) has overall responsibility for Disaster Management in Grenada. The National Disaster Management Agency (NaDMA) oversees the implementation of the National Disaster Management Framework. The structure of the National Disaster Management structure is shown in Figure 4.6. The Prime Minister has the authority to declare a national disaster. The authority for emergency powers outlined in the National Disaster (Emergency Powers) Act Cap 3 of 1990. The agency consists of the National Emergency Advisory Council (NEAC), Management Committees, District Committees and Village or Community Committees. A coordinator and 13 members of staff are employed at the national disaster office.

Figure 4.6: Organisational structure of NaDMA



Source: Adapted from Peters (n.d).

There are 15 national disaster management committees including:-

1. Public Information and Education
2. Damage and Needs Assessment
3. Transport and Road Clearance
4. Shelter Management
5. Health Services
6. Emergency Telecommunications
7. Disaster Relief Management
8. Public Utilities, Rehabilitation and Reconstruction
9. Welfare and Voluntary Services
10. Search & Rescue - Land and Sea
11. Security Services
12. Evacuation

13. Marine Pollution and Oil Spills
14. Earthquakes, Volcanic Eruptions, Floods and Landslides
15. Hazardous Materials and Hazardous Waste

Source: NaDMAC, 2005

At the local level, there are district and village disaster committees. At the moment there are seventeen district disaster committees. These are designed to support disaster planning at the community level. The district committees are coordinated by two coordinators attached the National Disaster Office.

4.9.2 Marquis and Soubise Study Area

Marquis and Soubise are two coastal villages in the parish of St Andrew, located on the east coast of mainland Grenada. There are very few community organisations in Marquis and Soubise. National NGOs, such as GREP and ART, have been involved with community development but mainly on a project basis. The main economic activities in these areas are fishing, farming, sea moss harvesting and craft making. These communities were among the most affected by hurricane Ivan in 2004 (OECS, 2004). According to UNECLAC (2005) many women in Soubise and Marquis lost their livelihoods because of Ivan and were having real difficulties in making a living.

4.10 Saint Lucia

Saint Lucia (616 sq. Km/ 238 sq. mi) is the second largest of the Windward Islands. The island is located 13° 53′ N and 60° 58′ W. It is 21 miles south of Martinique and 25 miles north of St Vincent and the Grenadines. Figure 4.7 shows the map of Saint Lucia with the study area identified. The island has a highly dissected and rugged topography that includes steep mountains and deep valleys. The highest peak on the island is Mount Gimie which is 3118 feet (950 metres) in height. A scenic feature of Saint Lucia is the volcanic twin peak of Gros Piton and Petit Pitons.

The economy of Saint Lucia is dominated by tourism, which is expanding, and a contracting agricultural sector. Saint Lucia has a population of approximately 173,720 people. Most of the population reside in the Capital Castries and its suburbs (Government of Saint Lucia, 2011b). Poverty assessment shows an increase in poverty from 25.1 per cent to 28.8 per cent between 1995 and 2005. However, for the same period there was a decrease the number of people who were extremely poor (CDB, 2007).

Figure 4.7: Map of Saint Lucia showing study area

Source: World Atlas

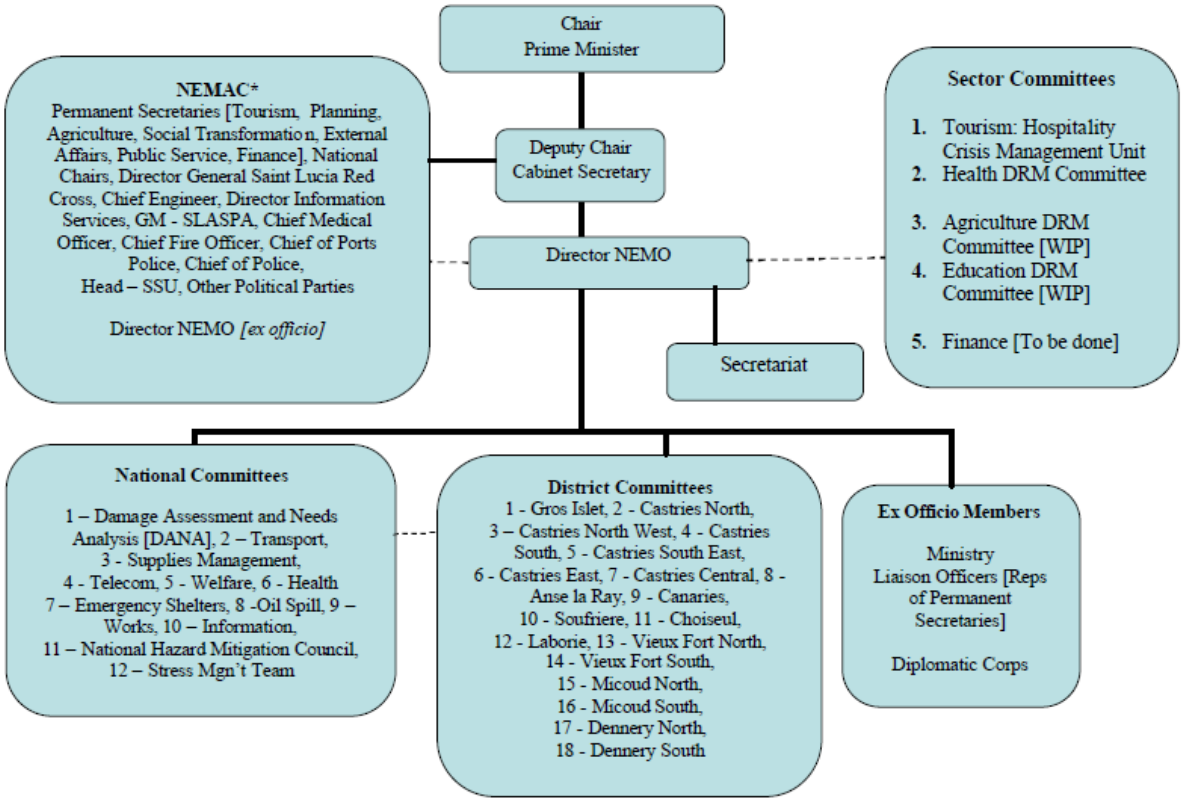
The interior consist of tropical rainforest with other vegetation types such as secondary forest and scrub at lower elevations. The island has a tropical climate regulated by the Northeast trade winds throughout the year. The mean annual temperature is 27° Celsius. The average annual rainfall is about 200 cm, most of which falls between June and December the wet season. The dry season is between January and May.

Saint Lucia is at risk to various hazards including hurricanes, earthquakes, landslides, flooding, and fires. The island has a dormant volcano located at Soufrière. At the site there is a drive-in volcano centre that feature sulphur springs. While there has not been any recent volcanic activity on the island, future eruptions are possible. The island is also prone to occasional drought. In 1980 Hurricane Allen struck the island and destroyed the agricultural sector and killed nine people. More recently there have been the impacts of tropical storm Debby in 1995, storm surges from Hurricanes Lenny in 1999, Omar in 2008 and Tomas in 2010. Hazards are discussed in Chapter 5 and a detailed profile is found in Appendix 9.

4.10.1 Disaster Management Framework in St Lucia

A disaster preparedness desk was set up in Saint Lucia sometime in the 1980's with an office established in 1990 operated by a coordinator. Prior to this development the island hosted several disaster meetings and conferences (Government of Saint Lucia, 2011a). The organisation evolved over the years as legislation changed which led to an increase and a new name. The National Emergency Management Organisation (NEMO) was eventually established in 2006. The National Emergency Management Organisation is the coordinating agency for disaster management in Saint Lucia. The NEMO consists of various stakeholders including Government, NGOs, the private sector and other stakeholders. The organisational structure of NEMO, Saint Lucia is shown in Figure 4.8.

Figure 4.8: Organisational Structure of NEMO, Saint Lucia



Source: Government of Saint Lucia (2011a, p.51)

The NEMO is governed by the National Emergency Management Advisory Council (NEMAC), which is chaired by the Prime Minister. The power to declare a State of Emergency or disaster resides with the Governor General on advice from the Prime Minister.

The national disaster management system is governed by various pieces of legislation, which include the Emergency Powers (Disasters) Act #5/1995 and The Disaster Preparedness and Response Act, 2000 which was replaced by the Disaster Management Act #30/2006. The National Disaster Management Plan provides operational guidance and was last revised in 2011. The plan is a comprehensive document, which consist of several emergency plans, Standard Operation Procedures (SOPs), policy documents, agency plans and guidelines (Government of Saint Lucia, 2011a). The NEMO carry out operations through several arms, which include 13 national committees.

The 13 national disaster management committees in Saint Lucia include:-

1. Emergency Works
2. Shelter Management
3. Telecommunication
4. Damage Assessment And Needs Analysis
5. Information And Education
6. Hazard Mitigation Council
7. Oil Spill
8. HazMat
9. Hospitality Crisis Management
10. Welfare
11. Supplies Management
12. Stress Management
13. Well Being

Source: Government of Saint Lucia (2011b)

Daily operations are carried out at the secretariat located at Bisee, which becomes the National Emergency Operations Centre (NEOC) in times of emergencies. On a local level, there are about 18 district disaster committees headed by a chairperson. There is a national warehouse and satellite warehouses to complement each district.

4.10.2 Soufrière Study Area

The parish of Soufrière is located on the west coast of St Lucia. Soufrière was the capital of the island during French rule and is the second largest town. It is located about thirty three miles from the capital Castries. A town once rich in agricultural production is now the most popular tourist destination on the island. However, agriculture and fishing are still important. The area is home to the Pitons twin peaks and many other natural features such as waterfalls, a drive-in volcano centre and deep gullies.

The population census of 2010, estimated about 8,472 people residing in Soufrière. This accounts for about 5.1 per cent of the island total population. Most people live in the town centre and the surrounding settlements of Palmiste and New Development. Soufrière is one of the least densely populated areas in Saint Lucia, with a density of 434 per square mile (Government of Saint Lucia, 2011b). The area has a poverty rate of 42.5 per cent and most of the poor are unemployed. The Soufrière area has been affected by various hazards including fires, hurricanes, storm surges and landslides.

4.11 St Vincent and the Grenadines

St Vincent and the Grenadines (389 sq.km/150 sq. mi) is a multiple Island State which consist of the mainland of St Vincent (344 sq.km/133 sq. mi), and over 30 islands and cays of the Grenadines. The Grenadines extends about 45 miles southwest of Kingstown. Several of Grenadines Islands are inhabited. The inhabited islands include Bequia (18 sq.km/7 sq. mi), Mustique (5 sq. km/1.9 sq. mi), Union Island (5.5 sq. km/3.5 sq. mi), Canouan (7.5 sq. km /3 sq. mi), Prune (Palm) Island, Mayreau, Petit St Vincent and Young Island. SVG is geographically located 13 ° 15′ N and 61° 12′ W. Figure 4.9 shows the nation state of St Vincent and the Grenadines and identifies the study area. The closest neighbours are Saint Lucia (25 miles) north, Grenada (75 miles) to the south and Barbados (100 miles) to the east. Mainland St Vincent is generally mountainous, gently sloping on the windward side and more rugged on the leeward coast. The Grenadines are smaller and less rugged than St. Vincent. The highest point is La Soufrière (4048 ft/1234 m), which last erupted on 13 April 1979. The fieldwork for this research concentrated on the main island of St. Vincent.

Figure 4.9: Map of St Vincent and the Grenadines, showing study area.

Source: islandtimeholidays.com (no date)

The island state has a tropical marine climate regulated by the North East trade winds. There is little variation in temperature, which ranges from about 26 °C to 32° C, with a small diurnal range of about 3° Celsius. Rainfall is high and falls mainly between June and December with an annual average from 60 to 150 inches. The rainy season coincides with the Atlantic Hurricane Season from 1st June to 30th November annually. There is a dry season, which usually extends from January to May.

The population of St Vincent and the Grenadines is estimated at 109,000 people (Commonwealth Secretariat, 2011). The largest concentration of people is located in the capital Kingstown and its suburbs. There are a number of informal settlements with dwellings constructed haphazardly without proper building regulations (GFDRR, 2010). Approximately 41.6 per cent of the population is exposed to two or more hazards (GFDRR, 2010). In addition, the mountainous

nature of the island has led to construction on slopes or along the narrow coastal plains. The economy of the island is highly dependent on both agricultural production and tourism. Agriculture is dominated by banana production, most of which is exported to the UK. Other crops include arrowroot, root crops, fruits and vegetables which are mainly sold in local and regional markets. Tourism is a growing sector and provides a means of economic gain, but also faces many challenges.

The island has a rich history shaped by the indigenous population. This was followed by the arrival of the French and British and then indentured labourer. The island changed hands between France and Britain before it was ceded to Britain in 1763 and 1783. Independence was gained from Britain on 27 October 1979. The island now has a democratic system of government based on the Westminster model. The government is headed by the Prime Minister and supported by a cabinet of ministers who are elected for a maximum of 5 years. The Head of State is Her Majesty the Queen who is represented by a Governor General.

The main hazards affecting St Vincent and the Grenadines are landslides, flooding, tropical storms and hurricanes. There is also the possibility of volcanic eruptions and earthquakes. In 1979 the island suffered a volcanic eruption. Although only one person is known to have died from the event, it created island wide impact. Over 20,000 inhabitants from the north of the island had to be evacuated and were displaced for many months. The most recent disaster to affect St Vincent and the Grenadines includes hurricane Tomas in 2010 and heavy rain that led to flooding in 2011. The details of these events can be found in Chapter 5 and Appendix 9.

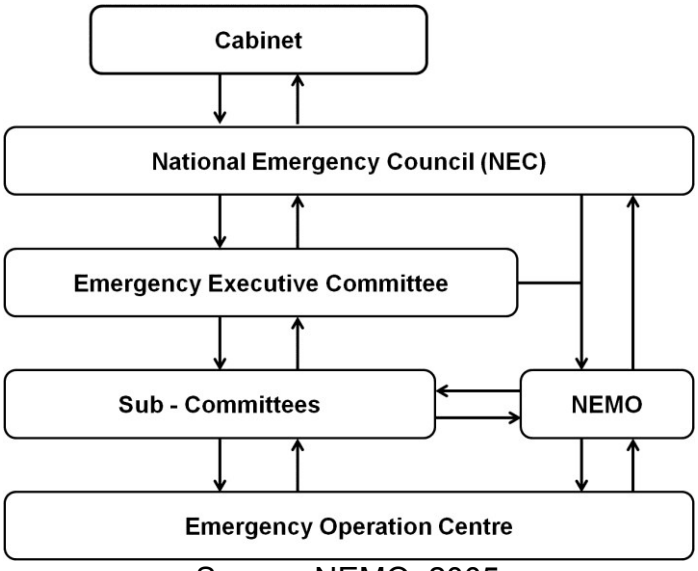
4.11.1 The Disaster Management Framework in SVG

Prior to 2001, disaster management was limited to response to mainly natural hazards such as hurricanes and storms. There was a disaster coordinator, who was assigned to a government official as an added responsibility to their regular portfolio. There was no budget or additional staff and certainly very little was done in terms of preparedness and long term risk reduction. On occasions when the

country was threatened or impacted by natural hazards, the government, people and organisations responded to get things back to operational status. However little was done to improve preparedness. Essentially the status quo remained.

The CDM approach was adopted in SVG in 2001 as a commitment from the government to enhance disaster management. The National Emergency Management Organisation (NEMO, 2005) was established in 2002 with the responsibility for national disaster management in SVG. Various pieces of legislation govern the operations of NEMO, including the National Emergency and Disaster management Act, 15, 2006, The Emergency Powers Act 45, 1970 and the Natural Disaster Relief Act, 1947. The Governor General has the authority to declare a national disaster on advice of the Prime Minister who is kept informed by the director of NEMO. The National Emergency Council has overall authority for National Disaster Management and is chaired by the Prime Minister, who is the Minister of National Security. This group consist of ministers of key agencies and key people from NGOs, the private sector and other specialist groups. The organisational structure of NEMO is shown in Figure 4.10.

Figure 4.10: Organisational Structure of NEMO, SVG.



Source: NEMO, 2005

The Emergency Executive Committee is chaired by the Director of NEMO and consists of representatives from ministries and other key stakeholders that are

grouped into 10 national sub-committees with specific responsibilities. The 10 sub committees include:-

1. Rehabilitation and reconstruction
2. Shelter and Shelter Management
3. Public information and education
4. Emergency supplies
5. Emergency communication
6. Transport and road clearance
7. Damage and needs assessment
8. Health services and
9. Voluntary services
10. Search and Rescue

Source: NEMO 2005

The EEC is responsible for the activities of the sub-committees as well as the policies and plans of the National Executive Committee. The National Disaster Plan (2005) consists of the hurricane plan, the volcano evacuation plan, the flood response plans and various forms and guidelines. The plan also outlines the roles and responsibilities of the various arms, which make up the NEMO. These include the National Emergency Council, the Emergency Executive Committee, the National Sub-Committees and District and Community Disaster Committees. The Disaster office and EOC was constructed in 2005 with funding from the World Bank.

Disaster Management at the local level is spearheaded by 13 district disaster committees and about 40 community committees. The committees include the existing community based organisations and recently developed community disaster committees. The activities of the various arms and stakeholders in disaster management are coordinated by the Secretariat of NEMO. The emergency office is staffed by three technical staff, including the director, and eight supporting staff. The office has responsibility for implementing the policy and strategies of the NEMO.

National hazard and vulnerability studies conducted in St Vincent and the Grenadines include:-

- Island wide flood risk assessment in 2006.
- Coastal vulnerability assessment of the eastern and southern coastline in 2007.
- Kingstown and Arnos Vale drainage studies to reduce flooding in flood prone areas (these areas still flood regularly, in particular, Arnos Vale where the airport is located which can result in the closure of the airport).
- The development of volcanic hazard maps which are used regularly in training and exercises.
- Landslide and slope mitigation for slope stabilisation in two communities.

4.11.2 Profile of the Fancy Study Area

Fancy is the most northern and most remote village on St Vincent and the Grenadines; it is located about 37 miles from the Capital Kingstown. The estimated population of Fancy is just over 500 people with about 150 households. Fancy is located in the Sandy Bay census district, which consists of the small national population and has a negative population growth. The district also has the second highest level poverty in the Windward Islands with about 50 per cent of the population living in poverty (St Vincent and the Grenadines Ministry of Finance, 2008). There is one primary school, a health centre, a number of churches, a pre-school facility and a post office.

The main means of earning an income in Fancy is through farming and fishing. There is one route in and out of Fancy, which is often blocked by landslides that can occur in episodes of heavy rain. Transportation is limited; there is one public bus in and out of the community and very few people own private vehicles. Job opportunities and development prospects are limited in Fancy. Almost all of the residents own land and houses in which they live. However, opportunities for employment and development in the village are almost non-existent.

4.12 Conclusion

This chapter looked at the special circumstances which hinder the sustainability of Small Islands Developing States. The recognition of these challenges has paved the way for the enhancement of national, regional and international support to advance the process of achieving sustainable development goals. While Caribbean countries have signed many international agreements, there is also a regional mechanism at work. CDEMA spearheads the regional mechanism and is supported by various other partners on behalf of 18 Participating States.

The chapter also presented the Anglophone Windward Islands study area and a brief background of each island. An overview of the disaster management framework of each island has been given as well as an examination of the communities that form part of the research. This chapter has shown that despite the complexity of island vulnerability, Caribbean states are working as nations and a region to build the resilience of both nations and communities to disasters. However, there are many challenges and gaps the research conducted for this thesis and other studies can help to reduce the gaps. Chapter 5 will present the findings of the fieldwork conducted in the four islands with households and key informants.

FINDINGS

CHAPTER FIVE

5 Household and Community Vulnerability and Capacity

5.1 Introduction

Vulnerability research has significantly increased since the 1970s and has considerably influenced approaches to disaster risk reduction (DRR). An example is the Hyogo Framework for Action (HFA) that emphasises that building the resilience of communities is needed for DRR. The Caribbean regional disaster management mechanism, which is aligned to the international DRR goals, has helped participating states to take a more proactive approach to disasters. The progress made by each state towards DRR differs, and while there is much progress at the national level, efforts aimed at building community resilience have been slow.

This chapter explores two main components of disaster risk reduction; vulnerability and capacity. The research assessed the vulnerability of people and places to determine the hazardousness of the Windward Islands and what this means for the implementation of DRR. This includes a review of past hazards and the extent of damage on the study areas. The research then focussed on assessing what capacities exist at the household and community level to determine what capacity building is needed to build resilience to hazards. This includes household, community and organisational capacities.

The findings indicate that the main hazards in the study areas are hurricanes and storms. It was found that there is a tendency for both organisations and people to focus their efforts on hurricane and storm preparedness and response. There has been an increased focus on other hazards at the regional and national levels, but the research finds that little has happened to influence a change in behaviour at the community and household levels. In addition, the focus on hazard tends to overlook the underlying conditions of vulnerability which limits the capacity to respond to disasters. The conditions include the lack of access to resources and

opportunities to make decisions, such as where to live, wise land use practices and the use of building guidelines.

Notwithstanding the vulnerabilities in the study areas, there are existing capacities at the household and community levels, which can contribute, to overall national risk reduction. The greatest capacity is the bonding social capital in communities, which cause people to support others in disasters but in close-knit communities this can also be a barrier to make changes. A focus on how to enhance capacity and reduce vulnerability will help to build community resilience. The findings are similar in the four Anglophone Windward Islands as they share similar physical and socioeconomic vulnerabilities. These islands represent a sub-regional grouping which collaborate on other issues and can benefit from greater collaboration on DRR.

This chapter presents the findings from the mixed methods research programme and includes both qualitative and quantitative results. The findings relate to the literature presented in Chapters Two and Four, and will be discussed further in Chapter Eight in relation to the objectives of this research.

5.2 Hazard History of the Windward Islands 1911 to 2011

This section examines the main hazards that have affected the Windward Islands from 1911 to 2011 and the accumulated costs and losses. However, because of the lack of data and conflicting statistics from a number of sources, it is only possible to provide an estimate of the frequency of hazardous events. The frequencies are shown in Table 5.1.

The data collected shows that there are often conflicts between different datasets in terms of the number of deaths, numbers affected and the cost of the disaster. Some sources provide a different type of costing such as overall cost, cost of damage, cost of recovery or cost to certain sectors. In addition, cost is sometimes provided in EC dollars or US dollars and in other cases in both currencies. In most

instances, the data is aggregated by country and does not indicate the communities that are more severely affected.

Table 5.1:Frequency of the main hazards affecting the Windward Islands between 1911 and 2011

Hazard	Dominica	Grenada	Saint Lucia	St Vincent & the Grenadines	Total
	Freq.	Freq.	Freq.	Freq.	
Tropical Weather Systems	28	15	33	18	94
Earthquakes	7	1	4	5	17
Landslides	3		7	1	11
Volcanic Activity	1	-	-	2	3
Floods	2	1	4	4	11
Fires	2		7	-	9
Drought	1	1	2	2	6
Civil Unrest	3	3	4	-	10
Oil/Chemical Spills	-	-	3	1	4
Transport Accidents	2	-	5	-	7
Others	-	-	1	-	1
Total No. of events	**49**	**21**	**70**	**33**	**173**

Source: Author

This is particularly the case with the oldest datasets. There were also instances where the occurrence of the event was noted, but there was limited or no information on the impact. In the cases where no data was available, the event is omitted from the profile. These factors limited the type of analysis that could be performed on the data, but were useful in providing an overall picture of hazard risks. The researcher found that the data provided by the National Disaster Offices of each island was generally more reliable. This is because they have direct access to information of the impact. They are also in the best position to revise the information as it is new information is found and when data has been verified locally. The limitations of the data point to the need for better standardisation of data collection on hazards, so that it will be more relevant to policy and decision-making. A detailed hazard profile is available in Appendix 9.

The hazard history of the islands was compiled using archival materials from databases such as CRED EMDAT, newspapers, situation reports, government reports and reports of other organisations such as CDEMA, Red Cross Societies, USAID, UNDP, UNECLAC, records compiled by disaster offices, project documents, journal articles and other accounts.

The historical profile shows that between 1991 and 2011 the Windward Islands combined were exposed to about one hundred and seventy three events. The collected data suggest that Saint Lucia had the most hazard events over the 100-year period. However, Saint Lucia has a more comprehensive record of past hazard events than the other three islands. Saint Lucia experienced about seventy events, Dominica experienced about forty-nine; Grenada about twenty-one; and St Vincent and the Grenadines about thirty two hazard impacts. Data on floods and landslides was difficult to gather because they occur mostly during the hurricane season. Records of flooding and landslide events outside the hurricane season were limited. Drought is also another hazard for which data was difficult to locate.

As can be seen from Table 5.1, the most common hazard for all the islands is tropical weather systems, which include; tropical storms, hurricanes, rainstorms and storm surges. Tropical weather systems account for just over half of all the hazards, some ninety-two, most of which occurred in Saint Lucia (33 events) and Dominica (27 events). St Vincent and the Grenadines and Grenada only had eighteen and fifteen events respectively. Hurricane Janet has been the most deadly hurricane to affect the four Windward Islands with 622 deaths, with 500 occurring in Grenada and 122 in St Vincent and the Grenadines. Overall, the number of lives lost in hazards is low. There was a major event prior to the reporting period where some 2000 people lost their lives in the 1902 eruption of La Soufrière in St Vincent and the Grenadines.

5.2.1 Hazards in Dominica 1911 to 2011

Extra caution had to be taken when collecting historical data on hazards and disasters of the Commonwealth of Dominica. This is because the Commonwealth of Dominica and the Dominican Republic are both referred to as Dominica. Table 5.1 shows a summary of the 49 events, which have affected the Commonwealth of Dominica. As noted earlier, about 28 tropical weather systems affected Dominica with the majority occurring from the 1990s onwards. This period accounted for 12 tropical weather systems with three occurring within the space of three weeks in 1995. The accumulated cost of the three events is estimated at 192 million East Caribbean dollars.

The most deadly hazard event in Dominica hazard history during the 100-year period is the 1916 hurricane, which killed about 50 people. However, the most devastating and costly event is Hurricane David in 1979, which caused island wide damage. Hurricane David killed about 40 people, affected over 80,000 people and injured about 3000 people. About 60 per cent of the population were left homeless. The hurricane affected every sector of society including agriculture, housing and infrastructure.

Hurricane Dean in 2007 was also responsible for causing island wide damage. This hurricane affected about 8,000 people and killed two and caused about 99 million East Caribbean dollars in damage. Buildings were severely affected with damage to 700 buildings, 500 of which were houses. The roof of the main hospital was also damaged. Damage was also done to coastal infrastructure including roads. Flooding and landslides were common and agriculture was severely affected, with some 99 per cent of banana trees destroyed lost.

Earthquakes are also responsible for widespread damage on Dominica. The most damaging earthquake occurred in November 2004 and cost about EC 90 million dollars in damage. Damage was concentrated mainly in the northern part of the island and affected about twenty thousand people. The 2004 earthquake affected critical facilities such as the airport, the electrical system and hospitals. There was

also damage to the road network, which delayed assistance to those who were injured.

Civil unrest is not a common occurrence but the Carib Riot in the 1930s is significant because Dominica has a designated indigenous settlement where most Caribs reside. The Carib riot resulted in five people being killed. More details of the hazards and disaster events can be found in Appendix 9.

5.2.2 Hazards in Grenada 1911 to 2011

Grenada has the lowest frequency of hazard impacts as shown in Table 5.1. Tropical weather systems have caused the most damage and there is limited data on the impact of other hazards. The most deadly hazard that affected Grenada is the 1955 impact of hurricane Janet that killed 500 people. The most costly event occurred 49 years later in 2004, when hurricane Ivan devastated the entire island. Hurricane Ivan affected over 80,000 people, 90 per cent of houses and cost approximately 900 million East Caribbean dollars.

Grenada also had a deadly invasion in 25 October 1983, which resulted in 45 Grenadians being killed along with 29 Cubans and 19 Americans. The invasion was related to a Coup about a week earlier, which resulted in the killing of the Prime Minister at that time and ten other people including four ministers. The details of the hazard and disaster events are available in Appendix 9

5.2.3 Hazards in Saint Lucia 1911 to 2011

As noted earlier hazards records for Saint Lucia show that about seventy hazards events occurred between 1911 and 2011. The events include thirty-three tropical weather systems and a number of other low impact, but damaging events, such as fires and landslides. A number of tropical weather systems have caused widespread destruction on Saint Lucia. The most costly of the weather systems include hurricane Allen in 1980, Tropical storm Debby 1994 and Hurricane Tomas in 2010.

Hurricane Allen cost about 250 million East Caribbean dollars. The hurricane caused the death of about 18 people, left about 6 thousand homeless and affected about 80 thousand people. Tropical Storm Debby affected less people but cost approximately the same as Hurricane Allen. Tropical storm Debby was associated with over 400 hundred landslides and damage to roads, bridges and agriculture.

The most costly event in the history of Saint Lucia is hurricane Tomas in 2010. The hurricane caused island-wide damage to Saint Lucia at a cost of approximately EC 907 million dollars. About 14 people were killed and thousands had to be evacuated. The hurricanes triggered hundreds of landslides and damaged a number of roads and bridges throughout the island. The damage to the agriculture and tourism sectors is still having serious repercussions on the economy of the island. The most deadly even to have occurred on Saint Lucia during the period under review is the 1938 landslide at Ravine Poisson, which caused the death of about 100 people.

Fires have also caused devastation, in particular, in the Capital Castries and Soufrière. In 1995, fire in Soufrière killed three people, destroyed seven apartment blocks and almost five hundred houses. More details on the hazards and disasters are found in Appendix 9.

5.2.4 Hazards in St Vincent and the Grenadines 1911 to 2011

During the period, 1911 to 2011, tropical weather systems have caused most of the damage in St Vincent and the Grenadines. The single largest number of people killed during the 100-year period is in 1995 when 122 people died during hurricane Janet. The hurricane also damaged crops and coastal roads. Past hurricanes and storm have significantly affected the housing sector in St Vincent and the Grenadines. Hurricane Lilli in 2002 and Ivan in 2004 have each affected over 700 houses. Hurricane Emily in 2005 affected over 500 houses and hurricane Tomas in 2011 affected about 1,200 houses.

The most costly hazard event in St Vincent and the Grenadines (SVG) is Hurricane Tomas in 2010, which cost about EC 130 million dollars. The hurricane resulted in the declaration of disaster areas in the north of the island. Just about six months after hurricane Tomas, SVG experienced a rainstorm, which caused flooding, landslides and the destruction to several bridges. This disaster cost about 84 million EC dollars.

In 1979 a volcanic eruptions was responsible for the largest displacement of people on the St Vincent and the Grenadines. When the volcano La Soufrière erupted about 20,000 people were evacuated from the northern part of the island. Two people were killed and there was widespread damage to agriculture. More details of the hazard and disaster events in St Vincent and the Grenadines can be found in Appendix 9.

The historical records of hazards and disasters for the Windward Islands show that the islands have experienced adverse impacts from a number of hazards, mainly tropical weather systems. However, there are other hazards such as volcanic eruptions and earthquakes that have the potential to cause serious damage. The tendency over the years has been to focus on the hazards that have a large impact and little attention has been given to hazards with small incremental impacts. Landslides and floods are quite common, but occur mainly during the hurricane season and are usually recorded under tropical weather systems.

Over the last five years, the islands have been encouraged to take a more comprehensive approach and focus on all hazards. This should be accompanied by an equal focus on people. Though loss of life to hazards is low, the financial losses have increased. This suggests that greater knowledge of hazards and better warning systems may have resulted in a decrease in deaths, but the number of people affected and livelihoods destroyed continue to increase.

The Windward Islands are very dependent on agriculture, which is often adversely affected by natural events. Many people depend on small-scale farming and both their livelihoods and family homes can be adversely affected. Similarly, those who rely on fishing their homes and fishing equipment can be destroyed. Much of the

population in the Windward Islands are therefore vulnerable, since the main settlements and developments are along coastal plains. In some instances, development on reclaimed land can further increase vulnerability. It is therefore important to understand how past hazards have affected the islands to help guide risk reduction, in particular in communities with higher levels of vulnerability.

5.2.5 Hazard Experience

This research posits that hazard experience and the level of disaster preparedness are related. In short, those who have experienced disasters will learn from that experience and will take steps to be better prepared. However, it is argued that experience does not necessarily result in better preparedness Data collected to address this is in two parts. The first looks at hazard experience and the second is experience of emergency shelters.

The data in Table 5.2 shows the hazard experience of participants in the research. Participants were asked to list the main hazards they had experienced. A total of 897 responses were gathered from participants. The most common event identified by participants was hurricanes and storms, with 43.5 per cent of the survey having experienced these events. The next most common was earthquakes, which had been experienced by 28.5 per cent of the participants. Participants identified seven other events, such as floods, landslides, volcanic eruptions, fires, drought and river flooding.

Table 5.2: Experience of past hazards.

Hazards Experienced	Freq.	%
Hurricanes and storms	390	43.5
Earthquakes	256	28.5
Floods	73	8.1
Landslides	73	8.1
Volcanic Eruption	55	6.1
Fires	32	3.6
Drought	10	1.1
River Flooding	6	0.7
None	2	0.2
Total number of events	**897**	**100.0**

The impacts experienced by the participants included damage to their homes (mainly roof damage), loss of household items and loss of crops and fruit trees. During a focus group discussion, a number of participants recalled their experience during a hazardous event. One parent in Grenada was a number of miles from her home when hurricane Ivan struck. She recounted the experience of being away from her home and children. She said that they had no family emergency plan and never discussed what to do in such events. She could not make contact with her family as all communications had been disrupted. She recalled being so frightened, even though where she stayed was relatively safe. After the hurricane had passed she began walking, trying desperately to get to her family.

In Grenada, an elderly woman recounted how she sent her husband to the shelter because he was sick. She stayed at home to ensure items in the house were secure. She spent the night shifting things around to avoid damage and placing containers to catch water as the roof leaked. She said, “I don’t know where I got the strength from to move the bed and other things, they were quite heavy”. She recalled that she stayed awake most of the night but managed to get a nap in one corner of the house. She recalled the frightening experience as if it just happened. She now lives alone as her husband has passed away. However, she is no more prepared now than she was then. Many of the participants indicated that they do not do things differently than they did when they encountered hurricane Ivan in 2004 and hurricane Emily in 2005.

Participants were asked about how they rebuilt their lives after being affected by hazards. When disaster strikes people often find it difficult to begin the recovery process, even when emergency assistance is available. Those affected do not always receive help and what they get may not be appropriate to their needs. Government, with support from humanitarian agencies, is the major provider of relief aid. Response activities are directed towards the reduction of human suffering and providing assistance. However, the data collected shows that many people received very little help or insufficient support. Assistance is usually provided to people in the form of building materials, food, clothes and other

supplies. A number of participants cited discrepancies in the distribution process. These include statements such as:-

"They give who they want; they give you what they want; and you have to take whatever you get" Focus Group Participant.

There are also those who claimed that:-

"Nothing happened to their (the neighbour) house but they get materials and I get nothing although my house was damaged" Fancy Participant.

These persons allude to political interference as influencing the distribution process:-

"They only give to those who support their party" Soufrière Participant.

These inferences erode community relationships and create tension in otherwise close-knit communities. Some participants would have liked to receive counselling, financial help to replace their children's school supplies as well as advice on how, or where, to build. The reality is that most people have no reserves to help them recover after experiencing loss from hazards. They are therefore dependent on the state or aid agencies for support. Many residents indicated that their houses were rebuilt on the same spot with no additional reinforcements. Despite some participants acknowledging that their homes were not safe, some felt that there was nowhere else safer for them to go, or they simply did not want to relocate. When participants were asked about which hazards they worried about the most, the two most significant responses, shown in Table 5.3, were hurricanes and storms and earthquakes, identified by 25.9 and 20.7 per cent respectively.

Table 5.3: Events that concerned participants

Hazards people worry about	Frequency	%
Hurricanes and storms	150	25.9
Earthquakes	120	20.7
All	78	13.4
Tsunami	43	7.4
Volcanic Eruption	43	7.4
Fires	38	6.6
None	33	5.7
Flooding	27	4.7
Landslides	26	4.5
Others	22	3.7
Total number of events	**580**	**100.0**

A few participants said that they were not worried about hazards. The research found that many participants from Dominica were not worried about hazards despite the high frequency of tropical weather systems to which the island is exposed. The participants reasons for not worrying about hazards are based mainly on their religious beliefs or the view that they cannot do anything about hazards:-

"God is in the midst, don't worry about anything" St Joseph, Dominica.

"Cannot stop them. That is God's work" St Joseph, Dominica.

Overall, participants were most concerned about hurricanes and storms and then by earthquakes. The results in section 5.1 show that hurricanes and other tropical weather systems are responsible for the most severe destruction in the study areas. The concerns expressed for earthquakes could be related to the earthquake of 2007, which was felt across the Caribbean region and caused extensive panic. Since then there have been devastating earthquakes in Haiti in 2010 and Japan in 2011. The results of concerns about hazards are similar to that of the main hazards experienced by participants. The data, however, differs at the country level. While there is a general sense of worry about hazards, it would

appear that this has not translated into actions to reduce risk to hazards at the household level.

5.2.6 Emergency Shelter Experience

The provision of emergency shelter is a critical part of the disaster management agenda of national disaster planning in the Windward Islands. The buildings used for shelters are public buildings such as schools, community centres, churches and other designated structures. Residents are usually advised to move to shelters if they live in high-risk areas or if their homes are not safe.

Participants were asked about the safety of their homes. The findings in Table 5.4 show a wide variation between the communities. Participants in Dominica were less certain about the integrity of their homes to withstand hazards.

Table 5.4: Safety of homes.

Is home Safe?	St Joseph & Layou Dominica %	Soubise & Marquis Grenada %	Soufrière Saint Lucia %	Fancy St. Vincent %
Yes	64.3	63.5	69.4	80.6
No	34.7	35.5	29.6	16.1
Not Sure	1.0	1.0	1.0	3.2
Number of Participants	**98**	**104**	**98**	**93**

Participants in Dominica and Grenada were concerned about the safety of their homes more than in Saint Lucia and St. Vincent. In Layou and St Joseph in Dominica there are a large number of homes constructed from wood. Although well-constructed wooden homes have been known to withstand hurricanes the age and quality of the homes in the Dominica study area is what makes them vulnerable. The Dominica poverty assessment of 2009 indicate that about 48 per cent of the dwellings in St. Joseph Parish were built before 1990 and about 28 per cent of the residents were not sure when their homes were constructed.

Observations indicate that many of these homes are in need of repairs, See Figure 5.1.

Figure 5.1: Example of the condition of some houses in Layou, Dominca

Source: Author

Those participants who said their homes were not safe gave a number of reasons, such as proximity to the sea, as shown in Figure 5.2 or a river or because they were located on a hillside. Other reasons include damage from past events, the age of their homes and the state of disrepair.

Figure 5.2: House in close proximity to the sea in Marquis, Grenada.

Source Author

Some participants stated they were often reluctant to go to shelters even when impact from a hazard was imminent. They perceived emergency shelters as generally unsafe, whilst others had experienced being in shelters that failed. The issue of shelters also has to do with the proximity of shelters to some communities. The La Poterie community in Marquis has one public building, which is a church that is unsuitable for use as a shelter as shown in Figure 5.3. During the focus group discussion, the participants from that community were concerned about not having a shelter in their area. The reason they were concerned is because the road to the nearest shelter is often flooded. The residents therefore relied on their neighbours if they needed to leave their own home.

Figure 5.3: A church in La Poterie, Marquis, the only public building.

Source: Author

Participants who stayed in shelters were asked to share their shelter experience. A few participants thought the experience was good and they had not encountered any major problems. On the other hand, others recalled that the experience was uncomfortable or bad for them. The reasons for such negative experiences were that there was no separation for males and females. Others felt that at times there was a lack of respect shown to the occupants of the shelter. Participants noted that some people damaged the shelter facility, which may require fixing before it can be returned to former use. Most shelters in the Windward Islands are schools, churches and community centres. Others felt that some shelter personnel had poor communication skills. Others recalled that they felt uncomfortable in overcrowded shelters and had no place to sleep.

During focus group discussions, participants were asked to give details of their coping strategies for hazardous events. The discussion showed that a number of strategies had been developed. Participants said that they pack and go to families prior to the event, not necessarily because their homes are safer, but because they preferred to be with family rather than in shelters. Other participants said that they all go to the safest room in the house. A number of participants indicated that they had built their homes with concrete roofs, as galvanised sheets usually blow off during a storm or hurricane. Some other participants admitted that they did not

make plans, but made spontaneous decisions if things became worse during an event. They recalled leaving their homes in the hope of finding somewhere safer, such as a neighbour or family. When one such home was flooded, the occupants spent hours standing in waist high water, some with babies in their arms, throughout the storm.

In the focus group discussion, one female participant was cooking in the midst of the storm and did not want to leave despite her husband insisting that they should leave. He decided to leave without her and his wife then changed her mind; they recalled:-

"As we stepped out the door the house lifted off its posts" Grenada Participant.

This type of last minute arrangement is very common in many communities and is often the main cause of injury and death in disasters.

5.3 Socio-Economic Characteristics of Respondents

The data collected on the socio-economic characteristics of households is shown in Table 5.5. The questionnaires targeted the head of the household or an adult who was at home. Therefore, the socio-economic characteristics are mainly those of the participants and not necessarily household heads. Table 5.5 shows that there are slight differences in variables across study areas.

The overall sample consisted of 60.1 per cent females and 39.9 per cent males. Females represent the largest percentage of respondents from each island. However, in the Dominica and Grenada communities there is a smaller ratio of male to female participation than in the Saint Lucia and St Vincent communities. In most cases, it was more likely to find women at home than men. In some cases where men were present, they encouraged the women to participate. In general, men were more reluctant to participate in the study than women.

In terms of age, the questionnaire targeted adults, therefore only a few participants are less than 20 years old in all the communities. There were no significant differences in the age distribution of participants in the other age groups across the study areas. Age is an important factor in terms of vulnerability and is addressed under vulnerable group of people.

Table 5.5: Socio-economic characteristics of household participants.

Variables	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière Lucia (%)	Fancy St. Vincent (%)
Gender				
Male	40.8	47.1	35 .7	35.5
Female	59.2	52.9	64.3	64.5
Age				
Under 20	3.1	5.8	3.1	4.3
20 – 29	14.3	26.9	20.4	16.1
30 – 39	19.4	17.3	19.4	20.4
40 – 49	22.4	13.5	21.4	26.9
50 – 59	20.4	11.5	18.4	19.4
60 +	20.4	25.0	17.3	12.9
Occupation and Employment				
No paid Employment	26.5	30.8	22.4	34.4
Self Employed	22.4	17.3	12.2	9.7
Primary Sector	12.2	10.6	5.1	26.9
Government Service	3.1	4.8	22.4	12.9
Construction	6.1	11.5	6.1	1.1
Retired	14.3	7.7	18.4	7.5
Other Occupations	15.3	17.3	13.3	7.5
Education				
None	2.0	0.0	0.0	2.2
Primary	59.2	56.7	40.8	60.2
Secondary	25.5	30.8	35.7	28.0
College & above	12.2	12.5	23.5	9.7
Number of Participants	**98**	**104**	**98**	**93**

5.3.1 Employment and Education

Employment and education are important variables in relation to household vulnerability in all of the study areas. Lack of paid employment accounted for over 20 per cent of participants from all the communities. However, the highest rate of

unemployment, 34.4 per cent, was among participants in Fancy, St Vincent followed by Soubise and Marquis, Grenada with 30.8 per cent. The percentage of unemployed females was also higher in all communities. Unemployment is considered as one of the main problems and was highlighted by 27 per cent of the participants in affected communities. Unemployment is higher among youths, in particular, males. Levels of youth unemployment in the Caribbean region are among the highest in the world and the education system does not prepare youths adequately for the regional and global labour market (UNDP, 2012).

There are limited economic opportunities in most of the study areas. Except for Soufrière, the other communities do not have any government offices or large businesses to provide employment opportunities. They depend on small-scale business, which the owner usually operates. Others are engaged in farming and fishing on a small scale. Soufrière, on the other hand, has much larger and more developed areas with a combination of small entrepreneurs and large-scale businesses, government offices, banks and hotels. However, the problem of unemployment was also cited as a major problem in Soufrière.

When asked about the main problems affecting their communities, responses from participants include:-

"Just unemployment specifically among males" Soufrière, Saint Lucia Participant.

"Unemployment among young people" St Joseph, Dominica participant.

Others suggested reasons why unemployment was a problem in the community.

"Young people don't want to work" Soufrière, Grenada Participant.

Many participants were concerned about the number of persons without jobs, attributing this to the cause of other social ills.

"No work in the community for young people, so they get into trouble" Fancy, St Vincent Participant.

Some participants also suggested that politics played a role in not being able to acquire work.

"There is political divide especially to get work" Soufrière, Saint Lucia Participant.

Retirees also contribute to social vulnerability. Retirees accounted for 18.4 per cent of the Soufrière participants and 14.3 per cent of the St Joseph and Layou participants. In St Joseph and Layou self-employed participants accounted for 22.4 per cent of employment. In some areas, the sides of the streets are often lined with many small shops and vendors. It is common to find vendors on the roadside in Layou and St Joseph roasting ripe plantains and selling them with or without codfish. In Grenada, 17.3 per cent of the participants are self-employed mainly in craft making and sea moss vending for the tourism industry.

Participants who were engaged in farming, fishing and forestry were grouped in the primary sector. Some of these participants are also self-employed. Fancy is highly dependent on farming and had 26.9 per cent of the participants employed in the primary sector. St Joseph and Layou had 12 per cent in this category, mostly engaged in fishing. In Soubise and Marquis 10.6 per cent of the participants were also involved in fishing. Very few participants from Soufrière are involved in the primary sector, which once dominated the area. The Soufrière area is now mainly focussed on tourism. This may only offer seasonal and part time employment for some people which does limit their income and force some to take up additional jobs elsewhere.

Twenty two per cent of the participants from Soufrière and 12.9 per cent from Fancy were employed in the government service as teachers, nurses and police officers. Soubise and Marquis had more participants employed in the construction sector than any of the other study areas. This is due partly to the construction of apartment blocks in the community, a joint project by the government of China and Grenada. The other participants were employed in various services mainly through the private sector and areas of government not included under government services. Based on field observation, the Fancy community is very

limited in terms of livelihood options, whereas the other study areas, in particular, Soufrière, have economies that are more diverse.

In terms of educational attainment, the highest achievement for most participants is primary level education. This accounts for more than half of the participants in Dominica, Grenada and St Vincent. However, very few participants in the Dominica and St Vincent study sites had no formal education. Soufrière had more participants achieving college and higher-level qualifications. Fancy had the least participants achieving college and above education, which could be a contributing factor to the high unemployment level and generally low paid employment.

5.3.2 Household Size

The data collected for household size is shown in Table 5.6. Household size ranged from 1 to 23 people. Most of the households surveyed in all the communities had an average of 1 to 4 members. In Soufrière, Saint Lucia, 39.8 per cent of households had between 5 and 8 people. The largest households were among the participants in the Soubise and Marquis communities with 10.6 per cent having 9 or more members.

Table 5.6: Household size

Size of household	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière Saint Lucia (%)	Fancy St. Vincent (%)
1 – 4	65.3	51.9	53.1	63.4
5 – 8	29.6	37.5	39.8	34.4
9 +	5.1	10.6	7.1	2.2
Mean	3.85	4.52	4.72	4.01
Total number of participants	**98**	**104**	**98**	**93**

5.3.3 Vulnerable Groups

The data collected on vulnerable groups is shown in Table 5.7. Vulnerable groups were measured by the number of people per household aged five and under, 60 years and over, pregnant women, the sick, people with mental health problems

and disabled people. These groups are considered vulnerable because for one or more reasons it is difficult for them to respond to hazards without assistance from others.

Table 5.7: Number of vulnerable people in the home.

No of Vulnerable people	St Joseph/ Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière Saint Lucia (%)	Fancy St Vincent (%)
0	41.8	36.6	30.6	43.0
1	37.8	34.6	36.7	35.5
2	13.3	14.4	24.5	16.1
3 or more	7.1	14.4	8.2	5.4
Total number of Participants	**98**	**104**	**98**	**93**

Note: Vulnerable people in this study describe persons 60+, children 5 and under, disabled, mentally ill, pregnant, sick.

Over 30 per cent of the participants from all communities had at least one vulnerable person living in the home. There were also over 20 per cent of participants in each community with two or more vulnerable people. The highest levels of vulnerability, in terms of the number of vulnerable people in the home, were in Soufrière, St Lucia. Almost half of the households had no plans for dealing with vulnerable household members in the event of a hazard. Those households that claimed to have plans actually had a series of ad-hoc measures such as the hope that the family, neighbours or community members who would assist. These included:-

"People in the community will take care of that" Fancy, St Vincent Participant.

"Family make preparations" Soufrière, St Lucia Participant.

Some claimed that they always kept medication in the home in the event of an emergency:-

"There is always asthma medication in the house" Fancy, St Vincent Participant.

Some participant simply had not given this much thought. One participant stated:-

"My son is disabled and my house not good, if anything I will have to run and leave him" St Joseph, Dominica Participant.

Many participants raised concerns about respect for the elderly in the community, especially by youths. Elderly people also expressed concerns about the feeling of loneliness

"People crave for someone to talk to especially over 60, things to keep them occupied" Elderly participant, Soubise, Grenada.

There are very few programmes designed to support the elderly in the community so they can feel that they are not neglected. Other elderly people also expressed that they needed help, both physically and financially, to repair their homes. Many disabled people are kept hidden away at home, their voices are not heard and they are not included in planning. The issue of vulnerable groups of people in disasters is an area that requires more research, which is discussed in more details in Chapter 7.

5.4 Housing and Land Tenure

5.4.1 Home Construction Materials and Home Ownership

The main materials used to construct the outer walls of participants homes are predominantly brick or concrete. This varied between study areas. In Saint Lucia 65 per cent of the participants homes are constructed with concrete blocks, while in Fancy it is 90.3 per cent. Some participant's homes are constructed predominantly from wood, especially in the St Joseph and Layou area in Dominica. Many homes consist of a combination of wood and concrete as the main walls. This combination of wood and concrete wall is common in large families where additions are made to family dwellings to accommodate an increase in family size. In some cases, such additions can weaken the integrity of

the dwelling. Houses tend to be one of the main sectors affected by hazards and this has more to do with the poor quality of construction and hazardous locations as discussed in chapter 7

Home ownership data is shown in Table 5.8. Participants were asked to state whether their homes were personally owned, family owned, rented or in another form of ownership, such as government owned or belonging to a friend. Most homes in all the study areas are owned either by participants or by their families. Very few homes are rented, particularly in Fancy in and Soubise and Marquis. The culture in the Windward Islands is one where people generally want to be the owner of a home, especially the poor. Therefore, many people are willing to build anywhere, with the materials they can afford and with help from family and friends. Many of these homeowners do not consider building guidelines.

Table 5.8: Home Ownership of Participants

Status of Home	**St Joseph/Layou Dominica (%)**	**Soubise/Marquis Grenada (%)**	**Soufrière Saint Lucia (%)**	**Fancy St Vincent (%)**
Owned	38.8	46.2	38.8	43.3
Family	40.8	49.0	35.7	53.8
Renting	19.4	4.8	22.4	0.0
Other	1.0	0.0	3.1	3.2
Total number of participants	**98**	**104**	**98**	**93**

The need for home ownership has also resulted in many people owning their homes but not owning the land on which it is built. This lack of title to lands has implications for accessing insurance and loans, as well as the permanency of the structures that can be erected on the property. It is also a risk to build permanent structures on land that is not owned. People in this situation build structures that can be lifted if they are asked to move. The lack of a firmly grounded foundation makes the home more vulnerable to natural hazards. This situation was found to be more prevalent among female-headed households. In addition, the land ownership system differs in some islands, in particular in St. Lucia, which is still based on the French system of land ownership.

5.5 Hazard Preparedness

Hazard preparedness was assessed using several variables to measure household preparedness and knowledge transfer. Household preparedness was assessed based on preparedness measures, family emergency plans and insurance. Knowledge transfer looked at training and access to information on hazards.

5.5.1 Household Preparedness

The question of disaster preparedness was asked as an open question to determine whether people undertake long term or short-term preparedness measures. The question also helped to determine whether participants prepared for a specific hazard or if they took a more general approach to preparedness. The results are shown in Table 5.9.

Table 5.9: Preparedness Measures, Familiy Emergency Plans and Insurance.

Island	Preparedness		Family Emergency Plan		Insurance		
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Don't Know (%)
Dominica	41.8	58.2	17.3	82.7	10.2	82.2	7.7
Grenada	48.1	51.9	17.3	82.7	4.8	89.4	5.8
St Lucia	58.2	41.8	22.4	76.6	16.3	80.6	3.1
St Vincent	66.7	33.3	22.6	77.4	11.8	82.8	5.4

In general, participants were more likely to undertaken simple preparedness actions related to collecting survival items, with water and food being the two most common preparedness items. Other items included torches, candles, first aid kit, batteries and battery operated radio. People's understanding of preparedness reflected the belief that they thought preparing was related primarily to having the ''basics'' required for safety or survival.

Many participants referred to hurricanes and waiting until a warning was given before they began collecting items. Participants also secured their homes and surrounding areas by trimming over-hanging branches, nailing down the roof or

placing bricks on the roof. There have been instances where people were hurt trying to make some of these last minute preparations.

Participants also mentioned securing important documents and some went to shelters or stayed with family or friends. Some of those who did not make preparations felt that “you cannot prepare for natural events”. Other participants claimed that they just listened to the radio and followed instructions. Some ensured that they had tools with them so that they could make repairs afterwards.

Some participants mentioned undertaking exercises, drills and training for emergencies as important aspects of preparedness. Few participants had actually undertaken tasks that are more complex, such as preparing an emergency plan, following building codes or retrofitting their homes for earthquakes. The lack of use of such complex tasks may be related to only being able to afford basic survival measures, lack of knowledge of hazards and a lack of capacity to undertake such complex tasks.

Fatalism also could contribute to being overly optimistic about the outcome of a large event. It is not uncommon to hear Islanders say, “God is a Vincy” or other nationalities. This is used in the context that God would not allow the island to be destroyed by adverse events. As stated earlier some participants indicate they do not prepare because of their belief in God and their belief that you cannot prepare for hazards.

More than half of the participants in Dominica and Grenada did not make any sort preparations. More participants in Saint Lucia and St Vincent were more prepared since they were still recovering from the hazardous events over the past year. It is suggested that recent experience is linked to the level of preparedness. Preparedness will be discussed further in Chapter 7.

5.5.2 Family Emergency Plans

Family emergency plans are promoted nationally and regionally in the Caribbean as an important aspect of the Caribbean Comprehensive Disaster Management (CDM) programme. A family emergency plan booklet was developed in 1994, adopted from Costa Rica and translated into English with support from ECHO (CDERA, 2004). The 2004 revised booklet is available for distribution to families in the Windward Islands. There are also other family preparedness guides made available by the Red Cross Societies in the region.

Despite this focus, the data suggest that family emergency planning is not undertaken in many homes. In all the study areas those who develop family emergency plans account for less than 20 per cent in Dominica and Grenada and just over 20 per cent in St Vincent and Saint Lucia. This is of concern since the family preparedness booklet has been distributed as a guide on a continuous basis in all the islands. It is costly to duplicate and distribute these booklets and if they are not being used, this should be evaluated and addressed.

5.5.3 Insurance

Only a few participants in all the communities indicated they had insurance, with less numbers of insured participants in Soubise and Marquis in Grenada. Soufrière in Saint Lucia had a slightly higher rate of insured homes. The main reasons cited for not insuring is that they could not afford to do so. The comments include:-

"No money to pay for insurance" Fancy, St Vincent Participant.

Some people also claim they do not have sufficient knowledge of insurance to make a decision of whether, or not, to insure. Those participants said:-

"Not sure how insurance is done" St Joseph, Dominica Participant.

"Never found out the procedure" Marquis Participant.

Participants in Dominica claimed:-

"They do not insure board house" Layou Participant or "They don't insure plywood homes" St Joseph Participant.

The researcher investigated the issue and found that they do insure such buildings, but premiums are much higher. Most of the insured participants were not even sure what type of insurance coverage they had or which hazards it covered. This is perhaps a reflection of a lack of understanding of insurance.

As stated in section 5.4 land ownership and family land issues can prevent people from purchasing insurance. Insurance cannot be bought for land, which is not owned by the occupant of the land. Therefore, some participants indicate that because they have not paid for the land they are unable to access insurance. In some cases, the land has been passed down to family members who do not own the entire lands and are limited in what they can do with the land.

Other issues such as location in high-risk areas can prevent people from being able to purchase insurance based on high premiums and what is available locally. In relation to insurance participants indicated:-

"I tried but was turned down because we live in the volcanic disaster zone" Fancy, St Vincent Participant.

There is a general lack of trust in insurance companies in the Caribbean, heightened by the recent failure of insurance agents in the region:-

"I don't believe in it, you do not get anything" Fancy, St Vincent Participant.

In some instances, insurance is an afterthought for many homeowners who simply assume they cannot afford it. The lack of insurance simply means that homeowners have few options when their homes are damaged in an adverse event. They usually do not have the resources to bear the cost and are often

dependant on the state or an organisation. There are cooperatives in some communities that offer small loans to members to help them recover from disasters, but resources are very limited.

> *Caribbean countries do not carry hazard specific insurance such as flood insurance and there are no government insurance schemes, except for health insurance. The lack of risk transfer mechanisms is particularly burdensome for the poor and for small farmers as repeated hazard impacts deplete resources and increase the level of their vulnerability (Carby, 2011, p.41).*

Small community cooperatives have helped people in some communities lessen the burden of losses from disasters. These cooperatives are, however, limited in the level of support they can offer.

5.6 Knowledge Transfer

5.6.1 Access to Information

The communication of information is critical in the adoption of ideas as suggested by Rodgers (1993) innovation diffusion theory. Participants were asked to select all the sources from which they receive information on hazards. The sources included radio, television, workshops, newspapers, text messages and church meetings among others. The respondents were then asked to rate the information on a 5-point Likert scale based on whether they felt the information was not very good to very good or unsure. A total of 393 respondents selected 927 choices. The choices are shown in Table 5.10.

Table 5.10: Main Sources of disaster preparedness information

Sources of Information	Frequency	(%)
Radio	336	36.2
Television	266	28.7
Internet	75	8.1
Workshops	48	5.2
Newspapers	40	4.3
Text Messages	37	4.0
Books	33	3.6
Family or other people	25	2.7
Booklets	23	2.5
Church	19	2.0
Disaster Office/Gov agency, Health Centre, Police, Fire	9	1.0
Community group/Meetings	8	0.9
Others	5	0.5
None	3	0.3
Total number of responses	**927**	**100.0**

Radio was the main source of hazard information for 36.2 per cent of participants, while television at 28.7 per cent was the next most frequent choice. Participants are less likely to gather information from sources that require reading or searching for the information. Acquiring information from social gatherings at church and other community sessions was selected by 1 per cent of participants. This is a little surprising as these occasions could play a more important role as a source for information sharing on hazards. Those sources offer the opportunity to clarify information and ensure that people understand how to reduce risk to disasters.

Respondents were generally satisfied with the information they received from the various sources. Less than 1 per cent of the participants said they did not get any information about disaster preparedness and so were excluded from the rating of this information. Those who rated their source of information, over 85 per cent felt the information was good or very good. This data is shown in Table 5.11. The general trend was quite similar for all the communities in the study.

Table 5.11: Rating of infomation on disaster preparedness

Rating of information on disasters	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière St. Lucia (%)	Fancy St Vincent (%)
Generally Good	85.5	83.3	85.7	89.2
Don't Know	10.3	6.9	7.1	6.5
Generally not good	4.2	9.8	7.2	4.3
Total number of participants	**97**	**102**	**98**	**93**

Note: Three (3) respondents did not identify any source of receiving hazard related information and so could not provide a rating of their sources. They are recorded as missing data for the purpose of statistical analysis.

Information can raise awareness and knowledge of people and influence behaviour to hazards. However, it is assumed by the disaster management agencies that providing information about hazards and preparedness will automatically translate to better preparedness. However as shown in table 5.10 people had access to various sources of information and according to table 5.11 they consider the information good but they do not make much preparations for hazards.

5.6.2 Training

Respondents were asked about whether they had received training in First Aid, disaster preparedness, search and rescue, damage assessment, shelter management and other related areas. The data collected indicates that 36.9 per cent of the respondents received training in one or more of the subject areas compared to 63.1 per cent who did not have training. First Aid had been taken by 22.5 per cent of the participants, while 10 per cent had undergone training in disaster preparedness. Other areas of training included shelter management, search and rescue, fire training, shelter and shelter management and damage and needs assessment, which accounted for some 20 per cent of the participants.

Some participants, shown in Table 5.12 said that they would be willing to attend training if it was offered in their community. This was similar for all the communities, but slightly higher in Fancy, SVG. Those who answered 'no' or 'not sure' gave reasons such as work commitments or other responsibilities. The

availability and offer of training in disaster related subjects does not automatically mean learning and understanding that can cause a change in behaviour. Some people are repeat participants at the same training sessions so numbers of attendees may not be that widespread. Attendance may also be affected by the location of training programmes, the facilitator and the educational level of participants. These factors will be addressed further in Chapter 7.

Table 5.12: Participants willingness to attend training.

Willingness to attend training	St Joseph/Layou Dominica %	Soubise/Marquis Grenada %	Soufrière St. Lucia %	Fancy St. Vincent %
Yes	75.5	70.2	75.5	83.9
No	23.5	27.9	18.4	15.1
Not Sure	1.0	1.9	6.1	1.1
Total number of participants	**98**	**104**	**98**	**93**

5.7 Community Mechanisms and Structures

This section presents data on the community networks and structures with particular reference to hazards. The study explored views on how people feel about their community and their sense of community in terms of belonging, acceptance, and safety. Participants were asked about their level of involvement in community groups, activities and decision-making. They were also asked to identify the main problems existing in the community and their opinions in relation to disaster preparedness in the community. A Likert scale was used to capture participants' responses to six questions relating to community social capital.

5.7.1 Length of Time Living in the Community

In all of the study areas, most participants have lived in the community for 20 years or more. The results are shown in Table 5.13. As can be seen from the data the communities in all the study areas appear to be stable. This could explain the involvement and the sense of belonging to the community shown by many participants. The length of time living in a community influences the

involvement and level of interaction of people with other community members. There is a level of trust and understanding from those residing longer in a community. This can create bonds, which can both be a benefit and a disadvantage.

Table 5.13: Participants length of time living in their community

Length of time living in the community	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière St. Lucia (%)	Fancy St. Vincent (%)
4 years or less	5.1	6.8	2.0	3.3
5 – 9 years	5.1	6.7	6.1	6.5
10 – 14 years	8.2	6.7	6.1	5.4
15 – 19 years	12.2	10.6	7.1	7.5
20+ years	69.4	69.2	78.6	77.4
Total number of participants	**98**	**104**	**98**	**93**

5.7.2 Safety of the Community

Participants were asked to rate the safety of their community using a 5 point scale which was later merged into a 3 point scale to show feeling of safeness. The question did not specify the context of safety, rather this was left up to participants to interpret safety in terms of hazards or other social issues. Table 5.14 shows the findings on safeness of community. The results varied widely in the study areas. The participants from Fancy felt their community was very safe. A number of the Fancy participants claimed that a lot of the crime committed in their community was people from outside of their community. Participants from Soubise and Marquis also alluded to this stating:-

"Most people in the community are related we only have problems when outsiders come to live or visit", Soubise Grenada Participant.

The importance of community relations was highlighted in the focus group discussions as useful in helping people cope during and after hazards. This support includes helping to clean up their community and help make repairs to homes and other structures.

Table 5.14: Feeling of Safety

How safe is the Community?	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière St. Lucia (%)	Fancy St. Vincent (%)
Safeness	13.3	38.5	23.5	4.3
Not sure	22.4	16.3	29.6	11.8
Unsafeness	64.3	45.2	46.9	83.9
Total number of participants	**98**	**104**	**98**	**93**

5.7.3 Feeling of acceptance in the community

Community relationships are important especially in small communities. If people feel they are important to their community, they will be more willing to contribute to the development of the community. This research explored participants' feeling of acceptance in the community. The results are shown in Table 5.15. There is a strong feeling of acceptance expressed by most participants in all the communities. The few who were not sure, or did not feel accepted gave several reasons for their answers. The older people did not feel accepted because of issues related to a lack of respect and not being able to get help to repair homes or look after their basic needs. In terms of younger participants, they cited reasons such as gossiping. The more middle-aged participants between age 40 and 50 felt they were targets of house break-ins and were neglected or ignored by politicians.

Table 5.15: Feeling of acceptance

Feeling of acceptance in the community?	St Joseph/Layou Dominica %	Soubise/Marquis Grenada %	Soufrière St. Lucia %	Fancy St. Vincent %
Yes	92.9	85.6	94.9	95.7
No	6.1	12.5	4.1	1.1
Don't Know	1.0	1.9	1.0	3.2
Total number of participants	**98**	**104**	**98**	**93**

5.7.4 Involvement in Community Development

Participants were asked about their involvement in community activities, groups and decision-making processes. The results of their involvement in decision-making in the community are shown in Table 5.16. Most participants did not take part in decision-making in the community. However, the Soufrière participants were more involved in community decision-making than those from the other study areas. Some participants suggest that the development of the community is the responsibility of the constituency representative. On the other hand, there are those participants who felt that their views are not taken seriously so there is no point becoming involved. During informal discussions with community leaders such as pastors, chairpersons of community groups and teachers, it was suggested that people become involved in response to specific interventions. If there is something being done in the community that requires community members to assist, they are usually willing to get involved. Participants gave examples of community involvement, such as women volunteering to cook, helping with cleanup operations and men assisting with construction. Those who were consistently involved in making decisions are usually active members of community groups and other organisations.

Table 5.16: Involvement in decision-making

Involvement in community decision making	St Joseph/Layou Dominica (%)	Soubise/ Marquis Grenada (%)	Soufrière St. Lucia (%)	Fancy St. Vincent (%)
Yes	29.6	28.8	42.9	30.1
No	70.4	71.2	57.1	69.9
Total number of participants	**98**	**104**	**98**	**93**

5.7.5 Community Social Capital

Community social capital is an important aspect of DRR as people in communities with good social cohesion are willing to help others during disruptive events. The research used a Likert Scale to establish the views of participants on community social capital. The results are shown in Table 5.17. The data suggests that there

is a strong sense of community cohesion in all of the study areas. However, it is clear that in Fancy, the poorest area, community cohesion is strongest. Fancy is a very small community where there is one primary school, one health centre, one playing field and a few churches. People seem to know everyone else or are related to them. These relations strengthen the bonds that exist in Fancy.

Table 5.17: Rating of six statements about social capital in the community.

Community Social Capital	St Joseph/Layou Dominica (%)	Soubise/Marquis Grenada (%)	Soufrière St. Lucia (%)	Fancy St. Vincent (%)
1. People in the community are helpful in times of disasters				
Disagreement	8.1	14.4	9.2	2.2
Neither Agree/Disagree	0.0	2.9	5.1	3.2
Agreement	91.9	82.7	85.7	94.7
2. **There is a close relationship between people in the community**				
Disagreement	20.4	29.8	19.3	5.4
Neither Agree/Disagree	20.4	9.6	11.2	6.5
Agreement	59.1	60.3	69.3	88.2
3. People willing to assist in developing community				
Disagreement	25.5	36.5	14.3	8.6
Neither Agree/Disagree	25.5	14.4	19.4	16.1
Agreement	49	49.1	66.3	75.3
4. People generally feel accepted in the community				
Disagreement	12.2	10.6	8.1	3.2
Neither Agree/Disagree	15.3	17.3	21.4	11.8
Agreement	72.5	72.1	70.4	84.9
5. Feeling that the community is divided				
Disagreement	40.8	52	60.2	68.8
Neither Agree/Disagree	17.3	10.6	16.3	15.1
Agreement	41.8	37.6	23.2	16.1
6. People keep to themselves in disasters				
Disagreement	82.7	81.7	82.7	94.6
Neither Agree/Disagree	1.0	4.8	4.1	2.2
Agreement	16.4	13.5	13.3	3.2

The response to the first four statements suggests that while community bonds are strong, people will rally together to help in the event of a disaster; they are the strongest in the study area of Fancy, as shown by the responses to statements 1 through 4. The answers to questions 5 and 6 suggest a strong community bond in Fancy with little suggestion of division or isolation. In addition, it should be noted that in questions 1 and 6, which are opposite statements, the scores in Fancy are

very similar. This shows a level of consistency in the responses given by participants. Participants further elaborated that even though they might have had arguments and do not speak with others in the community, in times of disaster they come together to help, but afterwards things go back to the way there were before. Despite reference to partisan politics, most participants agreed that people generally feel accepted in their communities. This can possibly be attributed to the length of time those surveyed have been residing in their communities, mostly 20 years or more, so there is a strong sense of belonging.

The initial selection of the study areas was based on several variables including hazard experience and other socio economic characteristics. The communities are quite similar in terms of social, economic and physical vulnerability to hazards. However there are variations in the type of hazards and the level of experience in each community. There are also differences in the number, types and level of operation of the civil society organisations within the communities. The comparison analysis is shown in Table 5.18.

5.18: Comparative analysis of the study areas

Islands & Study Areas	Hazard/Disaster experience	Vulnerability – Physical, Social, Economic	Community DRR Capacity
Dominica **Layou & St Joseph village In Parish of St Joseph**	• Hurricanes and Storms • Earthquakes • Landslides • Layou River Flooding	• High poverty • High unemployment among the poor • Many old wooden houses • Settlements close to the sea and rivers • Very low insurance	• No active Disaster Groups • Village Council has disaster Committee • Very little community DRR • Few community organisations
Grenada Marquis & Soubise, St Andrew Parish	• Hurricanes and Storms • Earthquakes • Flooding	• High Poverty • Very large families • Informal settlement along the coast • Very low insurance	• Very few community organisations • Non-functioning disaster committee
Saint Lucia, Soufriere Parish Fond St Jacques, Palmiste and New Development	• Hurricanes and storms • Earthquakes • Floods • Landslides • Fires • Drought • Low volcanic activity	• High poverty • High unemployment among the poor • Low insurance • Homes in need of repair in some areas	• Active Community Disaster Committee • Newly formed and active Community Disaster Response Teams • Many based organisations and NGO • Diversifying economy
St Vincent and The Grenadines Fancy	• Hurricanes and storms • Earthquakes • Floods • Landslides • Volcanic Eruption	• High poverty • Low development and employment • Remote Village • Small population, negative population growth	• Active disaster group, Red Cross Group , Community Disaster Response Team and Farmers cooperative

5.8 Conclusion

This chapter has examined some of the factors that affect vulnerability and capacity to hazards in the Windward Islands. This included an assessment of hazards, which indicate that hurricanes and storms are the most common hazards and have so far caused the most devastation to the islands. That being the case, the focus has been on preparedness for hurricanes with most people usually only making last minute preparations. The focus recently at the regional and national level has been on all hazards, but many households still only make basic preparedness for hurricanes and storms.

The qualitative and quantitative analysis also indicates that there are issues of poverty, low educational achievement, inadequate housing, limited livelihood options and unemployment that make disaster risk reduction a challenge. These conditions limit the ability to undertake the necessary and longer-term risk reduction measures, such as the purchase of insurance. However, people in poor and remote communities like Fancy pull together and cope much better than in larger, more economically advanced communities, such as Soufrière. This coping can, however, create a barrier for more effective disaster risk reduction from stakeholders outside the community. Chapter 6 will discuss how community organisations, NGO's and government support community development and disaster risk reduction.

CHAPTER SIX

6 Institutional Vulnerability and Capacity

6.1 Introduction

The previous chapter explored the physical and socio-economic factors that contribute to the vulnerability of communities in the Windward Island States. The findings indicate that the Windward Island communities are hazard prone, but there are socioeconomic factors that make some people and their communities more vulnerable than others. Householders on their own lack the capacity to effectively reduce risk to hazards. They require support from a range of other stakeholders including government, nongovernmental organisations (NGOs), community based organisations (CBOs) as well as the private sector.

This chapter presents results from key informant interviews and some qualitative results from the household questionnaires. The interviews were undertaken with representatives from government offices, NGOs and community-based organisations involved in community development and disaster risk reduction. In the Windward Islands these organisations contribute to various components of the disaster reduction mechanism.

The purpose of the key informant interviews was to determine the effectiveness of those interventions that contribute to community development as well as reducing risk to hazards. Phillips et al. (2010) propose a number of factors that determine the effectiveness of organisations in carrying out their mandates. Some of these factors include commitment, capacity, the length of time that they have been in existence and the structure of the organisation. The quality of the programmes and the impact on society are also important measures of effectiveness. Organisations that collaborate and network well with a wide range of other entities tend to be more effective than organisations that work mainly on their own.

The key informants were asked questions about programme development and beneficiaries. They were also interviewed about collaboration with other organisations, challenges and solutions. The organisations represented by the key informants are shown in Table 6.1.

Table 6.1: Organisations represented by Key Informants.

Organisations	Type	Total
Government	Housing	1
	Disaster Offices	4
	Community Development	1
	Service – Fire, health	3
	Town/Village Councils	2
Non-government Organisations	Red Cross	4
	National Development	2
Community Based Organisations	Faith Based	1
	Disaster Committees/CDRT	2
	Farmers Cooperatives	1
	Youth Groups	1
	Community Development	2
Total number of organisations		**24**

6.2 Overview of the Key Informant Organisations

The presence of organisations in a community can provide an opportunity to build a working relationship with the community on issues that are relevant to the entire community. This requires entities that are active voices on behalf of the community. To represent the community the organisations should have the capacity to function and implement suitable interventions based on community needs.

Some of the organisations involved in the research have been in existence for a long time and are well embedded in the community. A number of others were formed as recently as 6 months to one year ago and consequently will take time to develop. Membership and staffing varies from between 3 to over 20 people. Some of the organisations use temporary staff, depending on the workload. There

is also a large corps of volunteers to support the programme and activities of disaster organisations, Red Cross societies and Faith based organisations.

In terms of their operations, some organisations are guided by policy and guidance documents, while others are not. This information was gathered from responses such as:-

"There is a policy document, mission and vision statement. The policies are driven by the needs of the area to which the organisation respond" Key Informant 15.

In the case of newly formed organisations or those that are being reactivated or undergoing changes, documentation is often missing.

"We have not yet developed a plan of operation or have any documentation" Key Informant 12.

Most organisations were not willing to share a copy of these documents with the researcher.

"There is a Development Plan that needs updating, but a copy is not available" Key Informant 3.

There are also those organisations that have policies that need updating, but they continue to operate without updating their plans.

"*There is a strategic plan, but there have been no regular operations since 2007; we do what we can to keep up with in terms of community development"* Key Informant 3.

In some instances, organisations are flexible in their operations and design their programmes based on what is required at the time, particularly with respect to projects.

"Presently there is no policy or legislation that speaks specifically to community DRR but it has been incorporated into the agency plans. "We are guided by the project document" Key Informant 7.

Larger and more experienced organisations with regional and international partners tend to be more organised and effective in operations. Such organisations are usually guided by common policies adopted by their global partners. Organisations that were in existence longer were more organised and respected by the community. However, the ability of some older organisations to carry out their functions is hindered by a number of challenges that are discussed in section 6.8.

6.3 Participants Membership in Groups and Organisations

There appear to be very few community organisations in the study areas of Dominica and Grenada. Those that exist are mainly faith based organisations and sports clubs. In Soufrière and Fancy there is a wider range of community organisations including health, farmer's cooperatives, development organisations and community emergency response teams. In all the communities except in Dominica, participants are also involved in the Community Disaster Committees. The village council in Dominica is responsible for community disaster management but this is not the case in the other three islands. In the other islands, community disaster management is more community centred.

In Grenada, a few people said that they were involved with the disaster group while other participants claimed that the initial group was dissolved and another group established and that members of the previous group were excluded. Attempts were made to interview the leaders of the current group without success. Some past members claimed that the breakup of the old group had to do with political affiliation of some members. There appeared to be differences that could not be reconciled in the group and the decision was taken to form a completely new group. The new group also seemed to be facing some challenges. Members of the new group claimed that the hurricane season was almost over and they were yet to have any group meetings. This suggests that the new group is not functional, as the fieldwork was conducted in October and the hurricane season begins in June and ends in November.

Some participants indicated that they did not wish to be part of any group but were willing to assist if there was anything to do in the community. This corroborates what some community leaders said, that people are not consistently involved in community development but would assist when the need arises. While participants have taken part in activities and programmes planned by their organisations, there were no indications that they were regularly consulted by other organisations working in the same community.

6.4 Knowledge of Community Disaster Management

Many household participants associate the role of the community disaster committee with post disaster response but often do not associate them with pre-disaster preparedness. This raises the question of how much the committees engage with the community, in particular in terms of hazard and vulnerability assessment and awareness. One of the responsibilities of community disaster committees should be the identification of vulnerable people in the community, especially in terms of assistance to get to shelters and helping them to understand how they can reduce their own risks. Participants were also asked to identify groups that were active in community development and what was needed to ensure the community was better prepared for disasters.

There are communities that have community disaster groups and community plans, but some people are unaware of these plans. Participants were asked about their knowledge of community disaster plans. The results are shown in Table 6.2.

Table 6.2: Knowledge of disaster group and disaster plans.

Community	Knowledge of Disaster Group			Knowledge of Disaster Plan			Total number of participants
	Yes (%)	No (%)	Don't Know (%)	Yes (%)	No (%)	Don't Know (%)	
St Joseph/ Layou Dominica	64.3	13.3	22.4	44.9	14.3	40.8	98
Soubise/ Marquis Grenada	10.6	28.8	60.6	4.8	26.9	68.3	104
Soufrière St Lucia	68.4	19.4	12.2	49.0	31.6	19.4	98
Fancy St Vincent	60.2	12.9	26.9	41.9	15.1	43.0	93

Generally, just under half of the participants from three communities confirmed that a plan existed. However, only 4.8 per cent of the Grenada participants felt there was a community plan. This could be related to the issues of the functioning of the disaster group discussed earlier in Section 6.3. There appeared to be a high level of uncertainty in relation to the existence of community disaster plans. More people knew about the existence of the disaster groups than about a community disaster plan. The uncertainty was the highest in Soubise and Marquis, where there is a problem with the disaster group.

Participants were also asked to state the responsibilities of the disaster group. Most participants felt the groups were only to assist in times of disasters. This includes responsibilities such as taking people to shelters, managing shelters, conducting damage assessments and cleaning up after disasters. Very few participants associated the group with a wider sphere of responsibility, such as, pre-disaster assessments, educating the community and developing community projects to reduce disaster risk. In terms of improved community preparedness, most participants felt the need to work together more to improve shelters, educate people on disaster preparedness and have better disaster plans.

6.5 Main Problems Affecting Windward Island Communities

Household participants and key informants identified a wide range of problems affecting the study areas. The problem most cited by participants from all islands was that of unemployment, especially youth unemployment, as noted in the previous chapter. Many suggested that this contributed to anti-social behaviour of young people such as smoking, drug and alcohol abuse and violence. There were also concerns about respect shown to other community members, particularly the elderly. Participants noted a growing distance between people in the community; there was a view that people were not as close as they used to be. Some participants suggested that politics played a key role in the division among residents in the community. One participant stated that:-

"*Political division takes a long time to heal*" Dominica Participant.

The concern that politics was the cause of problems and divisions in the community was raised more in Dominica and the Saint Lucia communities. In Soufrière, Saint Lucia and Fancy, St Vincent participants were also concerned about the frequency of hazards, such as landslides and river flooding. Landslides often prevent access to these communities. In Fancy, in particular, residents were worried as the only road in and out of the community was regularly blocked. Simulation has been done in Fancy to explore the only other means of evacuation, which is by sea. While it is possible, it is quite slow and dangerous since the community is on the Atlantic side of the island, where the waves can be high and the sea quite rough. As noted in Chapter 4, this was the most remote part of the island where the indigenous people took refuge from the European colonisers.

In Fancy, farming is the main livelihood and farmers expressed concerns about getting to markets and receiving a fair price for their produce. They also expressed concerns about theft of their crops and subsequent loss of income. In Soubise and Marquis where fishing is very common, the concern is the lack of storage facilities and markets to sell their fish. This limits the quantity that the fishers can bring in at any one time.

Other problems were related to the poor quality of housing in Layou and St Joseph in Dominica and the roads in Soufrière, St Lucia. Issues related to the roads in Soufrière could be attributed to the extensive damage caused by Hurricane Tomas in October 2010. The island was still in the recovery phase when the fieldwork was conducted in September 2011. In Soubise and Marquis, Grenada, participants raised concerns about their coastal locations, some felt they were more threatened than before. Hurricane Ivan in 2004 and Hurricane Emily in 2005 affected almost all of the participants. After hurricane Ivan, houses and boats were found on the landward side of the street.

Participants were asked about the improvements they would like to see in their communities. There were few who had nothing to say or did not think anything needed improving. However, the improvements wanted by participants were mainly related to the problems highlighted by participants. Participants would like to see improvements in road conditions and better public transport in all study areas, but more so in Fancy. Participants in all the study areas would like to see more community activities, especially for youth people. Some felt that people are driven by political affiliations, which often create tension between community members. They would like to see members of their communities unite and work together much more.

During visits to the study areas, the researcher was able to observe and interact with residents in the communities. These interactions provided a better understanding of how people relate to living in hazardous locations. Residents in Soubise and Marquis can hear the sound of waves from their front porch. This gives an indication of how vulnerable they are to storms. Residents said they were used to living in that environment. In one family, the mother of a young baby was worried about the safety of her child, as the home had been destroyed in a previous hurricane. She admitted that:-

"Having a baby here made me think of the danger but for now it is what I call home so am okay with it" Grenada Participant.

Many participants have rebuilt in the same location after a disastrous event and a number expressed their willingness to relocate to a safer area. The OECS (2004) report on hurricane Ivan 2004 impact on Grenada indicates that people began to reconstruct homes almost immediately in the same location as before the hurricane. This was the only option for many people especially since the scale of the devastation was large for a small island state with about 90 per cent housing damage. The process of assistance was also very slow and people simply wanted to get on with their lives. Participants from the Marquis focus group discussion raised concerns about housing prospects in the community.

Residents of Marquis, Grenada highlighted their concerns about a recent housing development where 150 housing units are being constructed though a collaborative venture between the Chinese and Grenadian government. The developments are shown in Figures 6.1 and 6.2. Participants felt that the units were not large enough to house their large families. In addition, the type of apartment style building was new to the community. Participants were concerned that the units will be unaffordable and there was not enough land for a back-yard where they could garden. Some participants believed that since construction began in the area, there has been increased flooding in low-lying areas adjacent to the sites.

Figure 6.1: New housing community being constructed in Marquis, Grenada.

Source: Author

The project raises the issue of the degree of consideration for the needs of the community. The suggestion that the houses are unaffordable for members of the community means that others will benefit more than the community will. This is likely to change the make-up of the community.

Figure 6.2: One of the new apartment block in Marquis, Grenada.

Source: Author

An official from the housing ministry confirmed that the units were unsuitable compared to the size of the families in that community. The official further noted that the cost is also likely be unaffordable for many of the residents of that community. In addition, the official stated that applications far outweighed the units that were available. One key informant suggested that people on the coast were less interested in relocating than people in other areas. The ministry official confirmed that there is need for additional land to address the housing of large families residing in coastal areas. Situations such as this strengthen the belief that community needs are not informing development projects.

Though the key informants highlighted problems that were similar to those raised by participants, they did raise additional concerns. The level of illiteracy and poverty in some of the communities was emphasised. Illiteracy was seen as a

challenge to implementing some programmes. Key informants also noted a number of health issues that are affecting communities, such as hypertension and diabetes. Frequent fires were felt to be a problem, particularly in Soufrière. A workshop in Soufrière identified that some of the problems among young people were related to parents not being able to spend time with their children. Many of these parents work in the hotel industry and do not spend enough time with their children. The workshop focussed on the problem of domestic abuse which was affecting Soufrière and other communities and how the problem could be addressed at the community level.

6.6 Community Disaster Management and Development Programmes

6.6.1 Design of Programmes and Beneficiaries

Key informants were questioned on the design of their programmes and whether they target specific communities or specific groups in these communities. The type of programmes depended on the type of organisation, purpose of the organisation and availability of human and financial resources. Those organisations that are community based tend to focus more on programmes for specific groups in the community. In some instances, programmes are determined on the basis of the scope of the project, while in other cases, there are assessments to identify community needs. Government programmes tend to be more generic and are aimed at fulfilling national goals, not necessarily those specific to the community. Newly formed organisations, or those with resource constraints, focused on programmes on a short-term project basis, while others based their programmes on long-term strategic goals. A key informant In Dominica stated that vulnerability assessments and hazard mapping were done for the islands. The researcher was directed to search online for these documents but was unable to locate them.

Most community programmes have a general focus, while others targeted youths and the elderly as they were considered as the most vulnerable. In some instances, some organisations included these two groups in the design of their

programmes. In Grenada, there were a number of programmes, which targeted single women, uneducated and unemployed people. Some programmes were specifically for young women who dropped out of school due to pregnancy and young men who drop out for other reasons. It was noted by a key informant that:-

"It is difficult to get men involved in programmes" Key Informant 10.

In relation to the selection of vulnerable communities, some key informants stated that they used various tools in the selection of communities for interventions. In Grenada and Dominica, a list of vulnerable communities has been identified for future interventions. In both instances, they included the study areas of this research. Some of the criteria used in the selection process include; population size, literacy, economic status, gender issues, single headed households, disability, frequency of emergencies, development of the area, social environment, established community organisations and unemployment. Others are selected based on literacy, vulnerability and poverty.

One key informant noted:-

"In most communities the human resource capacity is low and there is need to build alliances with other groups outside the community who can strengthen human resources and help in community development" Key Informant 9.

In Saint Lucia, a number of vulnerability and critical facilities assessments have been undertaken. Communities have been identified in relation to vulnerability to certain hazards, such as, volcanic eruptions, flooding, drought, landslides, storms and storm surges as well as tsunamis. There are a number of active community based groups in Soufrière working to address issues in the community and foster development. Many of the programmes are designed for youths but have included other groups of people, such as the elderly and women. These programmes include education and skill based training at various levels from the unskilled and unemployed to teachers. Major challenges in programme implementation have resulted from people's attitude and a lack of volunteers to assist with the volume of work required. There is a stigma attached to certain types of programmes, such

as feeding the elderly, and this was cited as a challenge to the implementation of some programmes in Soufrière, Saint Lucia.

In St Joseph and Layou, a number of elderly people who live alone are considered very vulnerable. Dominica is known to have a large population of elderly people. Programmes in these communities have attempted to address behaviour change in youths, especially in relation to drugs and alcohol. The housebound and the disabled have been identified as persons who would need assistance to get to shelters and to be taken care of in the event of an emergency.

6.6.2 Training In Disaster and Emergency Management

There are similarities in some of the programmes related to disaster management in the Windward Islands offered to communities. The programmes are offered mainly by the disaster offices, Red Cross Societies and St John's Ambulance where they exist. Bi-lateral and UN donor agencies, such as the USAID and UNDP, provide financial support and instructors on some programmes. CDEMA also assist with the implementation of some training programmes.

The subject areas mentioned by the relevant key informants include damage assessment and need analysis (DANA), First Aid, disaster preparedness, mass casualty management, initial damage assessment, shelter and shelter management and hazard specific hazards training, in particular for hurricanes and earthquakes. More specialised training is offered including radio, communication, tracing, vulnerability capacity assessment (VCA), school safety and search and rescue. In some instances, training sessions are accompanied by simulation exercises conducted both locally and regionally. In communities with disaster committees, the members are given priority in training. These people may then become trainers to support further training in the community. The level of illiteracy in a community can make people reluctant to participate in certain programmes. People may also have difficulty making use of the information presented in these training sessions. The availability of lots of training programmes does not

necessarily translate to greater capacity. Based on experience, the same people from the same communities attend some of the training.

One of the concerns is the location and timing of many of the training programmes. Training sessions are designed to suit the schedule of the facilitators and often this does not always fit the schedule of participants, meaning they are less likely to attend. This is a concern, especially for rural communities, where many people are involved in farming and fishing. Such persons work all day and are often unavailable to attend training, especially when it is conducted outside of their residential area.

Media facilities in all the islands are also used to disseminate information to the public as part of the disaster management awareness drive. This was confirmed by the questionnaire where people identified having access to information via training as well as from radio, television and brochures. There are also brochures, which have been developed regionally and sent to various islands for distribution. The family emergency plan is a major feature of some national disaster management programmes. The booklets have been widely distributed in St Vincent and the Grenadines. The distribution of family emergency plans is discussed in Chapter 7. The National Red Cross Society has a similar family emergency booklet and conducts vulnerability and capacity assessments in vulnerable communities. The use of printed materials has implications for people who cannot see or read well or where understanding is limited. These include people who are illiterate, have problems with eyesight or are mentally challenged.

6.6.3 Scholarship and Educational Programmes

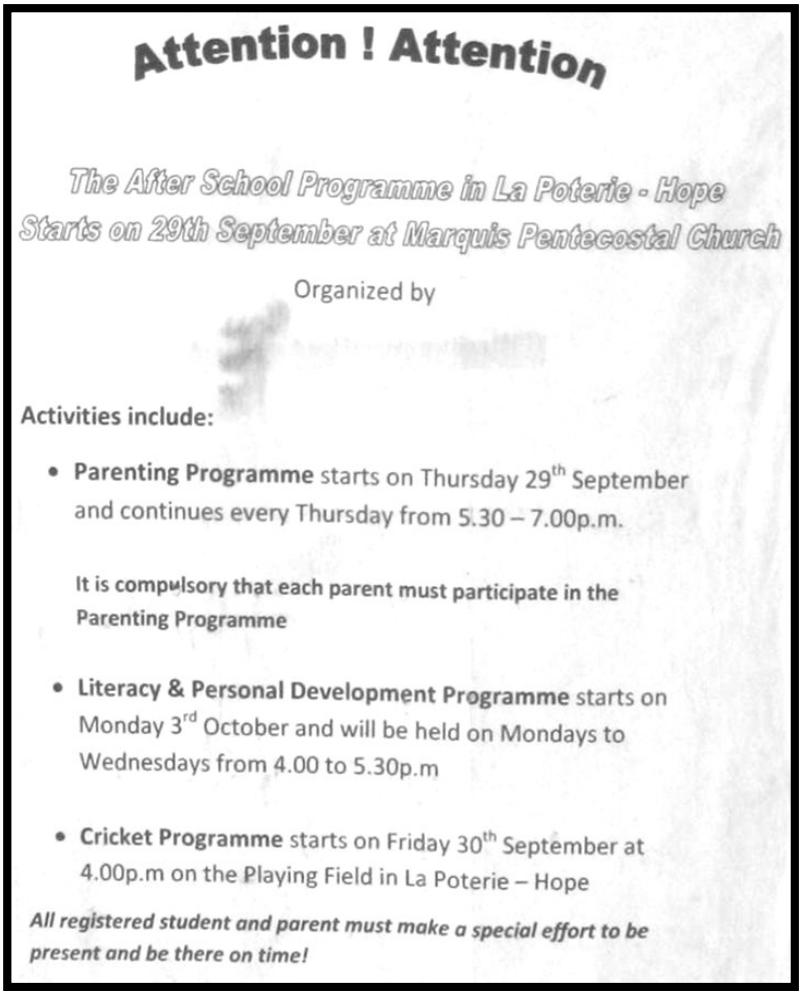
Community based organisations in Layou and Soufrière have provided scholarships to boost education in the community. The programmes in Soufrière are more established and available to a larger number of people at different educational levels and diverse fields. These include marketing, tour guiding and other areas designed to boost the growing tourism industry in Soufrière.

In Dominica funding for some community programmes is dependent on funding raised at the Titiwi festival. The Titiwi festival is a large community event organised by the Layou Improvement Committee to display the food and culture of the area. There are lot of fun activities, including river sports and the preparation of Titiwi, a tiny river fish in various dishes, which are sold to raise funds. The funds are used to finance the activities of the committee that are aimed at the development of the Layou community. In 2011, when the data was collected, the festival had to be cancelled because of an ecological disaster that led to the damming of the Layou River by landslides.

In Grenada there is an after school programme that assists children between 6 and 13 years old in after-school activities. Complementary to that is a parenting programme that targets the parents of these children to be better parents. In summer there is a holiday programmes, which targets children between the ages of 5 and 16, and engages them in supervised activities, on literary enhancement, basic life skills, storytelling, craft and culture. A reminder notice to remind residents about the after School Programme are posted in neighbourhood. An example is shown in Figure 6.3.

There have been other educational programmes to sensitise communities on HIV/AIDS and other health related issues. These programmes, however, are concentrated in small areas and often lack sufficient funding and personnel. One concern is that such good practices are not well documented and shared for possible duplication in areas with similar challenges. In Fancy, programmes have been undertaken on ICT training for farmers. Computer literacy is increasingly relevant for farmers, but their real issues are finding markets for their produce and the prevention of theft of their agricultural produce. There is a limited number of community programmes in Fancy outside of the emergency and disaster related training.

Figure 6.3: Notice placed in a shop about the after school programme.



Attention ! Attention

The After School Programme in La Poterie - Hope
Starts on 29th September at Marquis Pentecostal Church

Organized by

Activities include:

- **Parenting Programme** starts on Thursday 29th September and continues every Thursday from 5.30 – 7.00p.m.

  It is compulsory that each parent must participate in the Parenting Programme

- **Literacy & Personal Development Programme** starts on Monday 3rd October and will be held on Mondays to Wednesdays from 4.00 to 5.30p.m

- **Cricket Programme** starts on Friday 30th September at 4.00p.m on the Playing Field in La Poterie – Hope

All registered student and parent must make a special effort to be present and be there on time!

Source: Author

6.6.4 Environmental Programmes

Other programmes undertaken by the organisations consisted of clean-up activities at beaches, rivers and drains in all of the communities. In Fancy, one project involved the construction of a footbridge over a river to provide safe crossing. There are fund-raising activities in all the communities through sporting activities and festivals, which also serves to bring the community together. There are, however, issues on the lack of proper facilities for such activities in all communities with the exception of Soufrière, St Lucia.

The disaster management structure in the Windward Islands consists of government entities, the private sector, community organisations and other stakeholders. The structure in each island is discussed in Chapter 4. Therefore,

the key informant organisations have been involved in the disaster management programmes on various levels, including preparedness, response and recovery and are represented on different national disaster subcommittees.

Some NGO's and Community Based Organisations have assisted in home repairs and reconstruction and the overall support for those affected by hurricane Tomas in 2010 in Saint Lucia and St Vincent and hurricanes Ivan (2004) and Emily (2005) in Grenada. Community groups in Grenada and Soufrière have used key attractions to support initiatives. In St Joseph, faith based organisations are involved in feeding programmes mainly for the elderly, the homeless and the disabled.

6.7 Collaboration among Organisations

Collaboration between organisations was found to be minimal, an issue that was highlighted by several of the key informants. Poor information sharing meant there were cases of duplication of activities leading to community division and conflict of interests. It was found that organisations mainly collaborate with similar organisations, such as government-to-government. In some instances, the collaboration was based on funding and implementing agencies. There have been projects where different NGOs and community-based organisations were responsible for implementing different aspects of the same project. However, this is not a regular occurrence. There is also collaboration in terms of more established organisations acting as advisers to recently formed organisations. This is especially the case for larger NGOs and smaller community organisations.

National Disaster Organisations and Red Cross societies tended to collaborate with a wider cross-section of organisations including government, community, NGOs and the private sector as these are a critical part of the national disaster management framework. However, one of the concerns highlighted by disaster offices in all the islands is that national committees and sub-committees are not always as proactive as they should be. Notably there is limited collaboration with

the communication entities, media, academic institutions and scientific entities in all study areas.

6.8 Challenges in Programme Implementation in Communities

The challenges faced in implementing programmes at the community level are similar in all four islands, but there are differences in magnitude, as well as issues that are island and community specific. In Dominica and Saint Lucia, there is a local government structure, which consists of town and city councils that are not present in St Vincent and the Grenadines and Grenada. The existence of these structures means that there are slight differences in the way things are done at the community level. The town and city council structure allow community issues to be addressed at the local level. It was found that where these structures did not exist, such as in Grenada and St Vincent and the Grenadines, community problems were seen as less of a priority.

The main challenge highlighted from the key informant interviews that is common to all islands, is that of financial constraints to fund community programmes.

"Money is a major problem which limits the ability to operate normally. Our capacity is greatly reduced and we are not able to contribute, as we should. There is no committed budget" Key Informant 9.

This funding shortage has hindered groups in providing continuity of implementation. A number of organisations have turned to both fund raising and bidding for projects from international NGO's.

"Many projects fulfil the needs of funding agencies rather than the needs of the community; they are not reaching sustainable goals" Key Informant 21.

This constraint has meant that often staff and volunteers are recruited on a project by project basis.

"There have been no regular office operations since 2007 due to a lack of funding to maintain a regular staff so there is only one permanent staff" Key Informant 9.

In the past financial constraints have forced some groups and organisations to disband and abandon a number of programmes. A number of participants voiced their dissatisfaction with the operation of some groups, often mentioning political bias and leadership struggles as factors that have contributed to the collapse of some groups. In relation to funding, the government agencies are mainly funded from a government budget, which covers operational cost, staff, utilities and overheads. There is no specific focus on funding community activities.

"There is a department budget but there is no specific budget for CBDRR but training is a line item in the department budget, which focuses on communities. Budget to support such programmes is limited" Key Informant 1.

The lack of a specific budget to support community DRR limits the types of programmes that can be implemented in the community.

Another challenge is the commitment and dedication from members of organisations. Key informants indicated that the same people do everything, which can lead to over exertion. This is also applicable to staffing if there is a few trained staff with the capacity to undertake certain responsibilities. In the Dominica Disaster Officer, no staff member is assigned to the community programme because of staff limits. In Grenada there are 17 District Disaster Committees assisted by two staff members of the national disaster office. However, in St Lucia and St Vincent, with over 15 District Disaster Committees there is only one staff member with responsibility for all the district committees, in addition to other responsibilities.

Difficulties in getting information were also considered a challenge. "Gatekeepers" and "Red Tape" makes access to information difficult. There is no available database on communities to assist in decision-making. In some cases, organisations do not share their data. Time and resources are then used to collect information that others already have. Timing is important in particular when projects are dependent on donor funding. Donors usually have a budgeting period and if that is not adhered to funding sometimes have to be renegotiated. In such cases, projects are halted while such negotiations take place.

As discussed earlier, leadership struggles have caused problems in the functioning of community organisations. Challenges to the leadership of community organisations affect their ability to deliver on community programmes. This may be at the highest level of management where there is a Board of Directors. A key informant noted in that regard:-

"Different board members have different perception of what the vision of the organisation should be so things cannot run as smoothly and as efficient as it should" Key Informant 15.

The community may also have their own perception of what they want from the organisations. One key informant stated;

"We try to get people to learn skills to build their capacity but most do not want that, they find progress is slow" Key Informants 10.

If community members do not understand how a project benefits them, the level of participation and acceptance can be quite low. This re-emphasise the importance of consultations with communities and the design of programmes around community needs. Such dialogues help to clarify differences in perception. Both the community and organisations could be looking at the same issues in different ways and working together can improve the vision of how to better develop the community.

Changes in volunteerism have also surfaced as a challenge in all the study areas. These issues range from a fast turnover of volunteers due to migration outside the community or even the country. Some key informants said that it was difficult to get people to volunteer, especially young people. Generally activities in communities are conducted without the knowledge and involvement of the community organisations.

6.9 Conclusion

This chapter presented the findings from the qualitative key informant interviews on the programmes related to community development and disaster risk reduction. There are also findings from the open-ended questions with community participants on their involvement in community organisations and their knowledge of the work being done by these organisations.

The findings indicate that community organisations have their own criteria for determining vulnerable communities and the programmes they implement in communities. The criteria are usually different for each organisation. However, established organisations such as the Red Cross usually have criteria similar to their regional and international partner organisations. It is noted that community stakeholders are not usually involved in the selection of vulnerable communities and the types of programmes aimed at community development. This is more the case for NGOs and government organisations that are not located within the community. Organisations located in the communities are more challenged in terms of being organised and having access to funds to implement community programmes. In addition, some community organisations are not stable and trusted by the community members, which can affect their ability to advocate on behalf of the community. These concerns will be addressed in more details in the discussion in Chapter 7.

CHAPTER SEVEN

An integrated, multi-hazard, inclusive approach to address vulnerability, risk assessment and disaster management, including prevention, mitigation, preparedness, response and recovery, is an essential element of a safer world in the twenty-first century
(UN, 2002; UN/ISDR, 2003 cited in O'Brien, et al., 2006).

7 Reducing Vulnerability and Enhancing Capacity

7.1 Introduction

This research addresses the key question "Can effective disaster risk reduction be implemented in communities? To address this question the research critically examines the vulnerability and capacity of communities to hazards in the Windward Islands. This was undertaken through the following objectives.

- An investigation of the factors affecting vulnerability to hazards in the Windward Islands.

- Identification of existing capacity in reducing risk and building resilience to hazards in the Windward Islands.

- An analysis of the effectiveness of community programmes in reducing risks to hazards in the Windward Islands.

The study of disaster risks is multi-dimensional and includes a rich diversity of stakeholders, themes and processes. To address this diverse issue effectively, this research adopted a mixed methods approach to achieve the research aim and objectives. The literature made clear that disasters are more about the actions and inactions of people and less about the impact of natural events. It was both necessary to draw together information on the hazard events and interface with people to understand their vulnerabilities. To gain this knowledge data was gathered using questionnaires administered to household participants using systematic random sampling so that a representative view of the wider community

could be developed. This data was further supported by in-depth discussion with focus groups and participant observations as well as other written accounts.

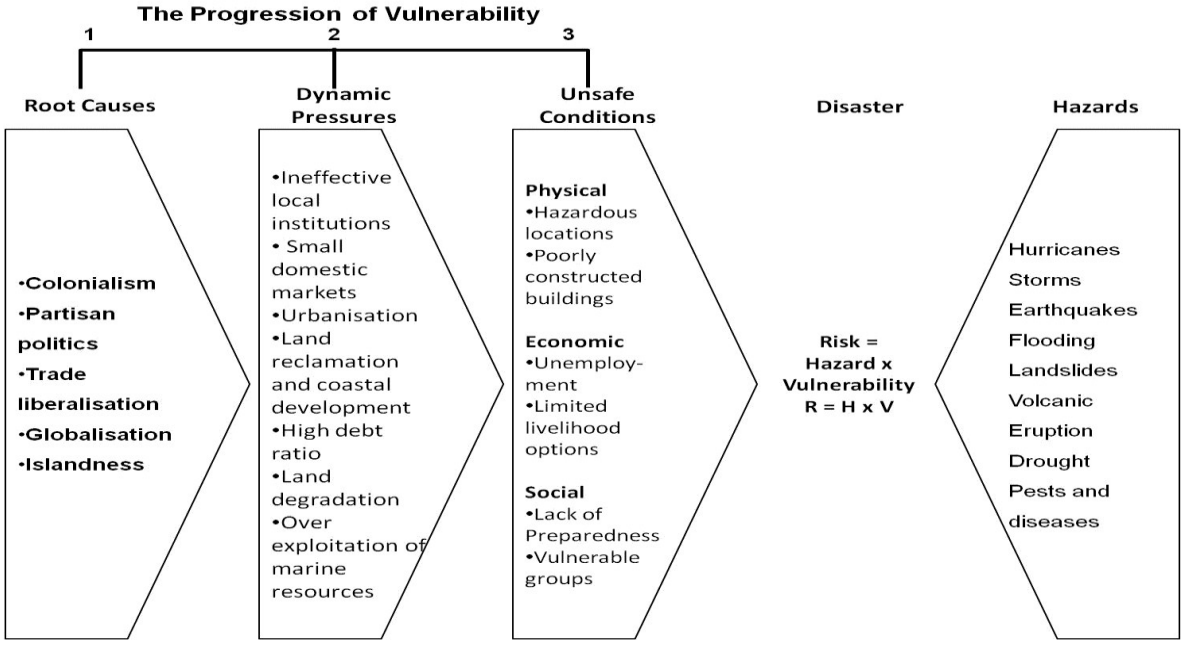
International, national and local stakeholders contribute to community development and DRR in the Windward Islands. They make decisions, with or without the involvement of the communities, which are perceived as beneficial to the community. To gain an understanding of what informs programme development in such organisations, key informant interviews were conducted based on insights gathered from the literature. The results of the vulnerability and capacity assessments of households and organisations are presented in Chapters 5 and 6. This chapter will further explore the empirical findings in relation to the physical, socioeconomic and institutional factors highlighted in Chapters 2 and 4, as such factors influence vulnerability and capacity in the context of the Windward Islands.

Research by O'Keefe et al. (1976) was instrumental in shifting the focus of disaster management from hazards to vulnerability. This debate and others that follow emphasise that, without people there would be no disasters. Vulnerability has now become the focus of disaster studies and though it has various definitions and dimensions, this shift has been instrumental in understanding the relationship between hazards, humans and disasters. As stated by Bankoff (2001, p. 30) "vulnerability as a concept has proven useful as a means of assessing disasters within their socio economic, political and environmental context that was previously sorely lacking".

The literature therefore identified various dimensions of vulnerability including physical, social, economic, political and institutional. These aspects can determine both the vulnerability of people as well as their capacity to respond to hazards. Collectively they contribute to the hazardousness of a place (Hewitt and Burton, 1971). Physical vulnerability, also called biophysical vulnerability (Cutter, 1996), refers to the potential for damage to occur to the built environment and human environments because of hazards. Components of physical vulnerability include human settlements in hazard prone locations, rapid urbanisation and population growth, poor quality housing and infrastructure.

Not all hazards result in disasters. Disasters occur because of varying levels of vulnerability in a society exposed to hazards. These conditions of vulnerability could include poor construction techniques, degradation of the environment, poor land use management and inadequate protection from adverse events (David, 2001). Conditions of vulnerability develop overtime from issues that are embedded in the history and culture of a society. Blakie et al. (1994) claim that the root causes of vulnerability are related to unsafe conditions, reflect a lack of capacity and is exacerbated by external forces. This dynamic pressure leads to a progression of vulnerability that causes hazards to become disasters. This progression of vulnerability as it relates to the Windward Islands is illustrated in the vulnerability model in Figure 7.1. As discussed in the literature review the root causes of island vulnerability stems from a combination which include their colonial past, their islandness and external factors which influences local socio-economic conditions, Figure 7.1.

Figure 7.1: Pressure and Release Model adapted for the Windward Islands.



Source: Adapted from Blakie et al. (2004)

Research on social vulnerability has gained momentum but still lacks a very clear definition (Birkmann, 2006). Social vulnerability is generally used to encompass all aspects of a society that can be affected by a hazard including people,

economic sectors, the built environment and the natural environment. There is also a wide range of indicators used to measure social vulnerability. Those that contribute to the vulnerability of the Windward Islands include poverty, gender, age, disability, employment status, education, livelihoods, family structure and weak governance institutions. These are factors related to dynamic pressures and the unsafe conditions shown in Figure 7.1.

Vulnerability and poverty are not synonymous. However, the poor are more likely to experience the negative effects of hazards. The people and communities that are poor, isolated and unable to access basic services are likely to have difficulty responding to, coping with and recovering from disasters. During hurricane Katrina many of those who remained in New Orleans did so because they had no access to transport and nowhere to go even if they could have left New Orleans (Phillips and Fordham, 2010). The situation is even more overwhelming in small islands because of the proportional impact of a single event on entire island states. Institutional failures can also expose people to greater risk when hazards strike. The imbalance between vulnerability and capacity is reflected in deaths, injuries, damage to crops, buildings, roads and other infrastructure and the displacement of people. The injection of the necessary financial, human and institutional resources can affect the degree of the damage caused by hazards. Hazard damage and development are related and as suggested earlier addressing either development or DRR contributes to reduction in the other because of their close relationships.

To understand the hazardousness of the Windward Islands, this research reviewed the inherent vulnerabilities of SIDS, which are characterised by economic, social and environmental challenges that impede development. The Windward Islands are generally dependent on the primary sectors such as agriculture, fishing and forestry. These sectors are influenced by international trade agreements and susceptible to the impacts of hazards. In addition, options to diversify are directed primarily towards tourism development, which are similarly affected by hazards and global financial shocks. It is evident that there are limited viable economic options in the Windward Islands, particularly for rural communities. These are linked to root causes shown in Figure 7.1 which are not easily addressed or they are out of the control of those who are made vulnerable.

Islands in general including the Windward Islands are small and limited in terms of resources, including financial, physical and human capacity to prepare for and respond to hazards and to undertake longer-term risk reduction. The small physical and population size of the Windward Islands means that the state usually has only one critical facility such as a single main hospital, airport, port facilities, major roads and utility plants. When the one critical facility is affected it represents one hundred percent damage. The Windward Islands are dependent on external funding to support many development projects, which can create a number of limitations. There have been instances where structures are designed and built using building standards from the donor country, which can be inappropriate for the receiving country (Office of Foreign Disaster Assistance (OFDA), 1991).

Firstly, this chapter looks at an analysis of the main hazards that have affected the Windward Islands from 1911 to 2011. The chapter then examines other factors affecting the vulnerability of the islands including socioeconomic factors. The key socioeconomic factors, which are addressed, include poverty, which results in a double bind and cuts across other socioeconomic factors. Gender is found to affect vulnerability but in societies with strong social capital, this disparity is less evident. The vulnerability of the elderly and disabled are addressed as both groups of people are often omitted from plans for disaster risk reduction. This chapter also argues that low level of achievement is related to livelihood choices, but that in communities where options are limited even those with higher education remain unemployed. In addition, unemployment is higher among females than males. The chapter also discusses the general low level of preparedness despite hazard experience and the availability of lots of hazard related information. However, there appear to be a slight increase in preparedness with more recent experience even though it is basic and often last minute actions.

The chapter shows that community cohesion and social capital are important community capacities, which are significant in building resilience. The final section presents a number of factors that affect the effectiveness of community programmes and the capacity to support DRR in the Windward Islands. However, the chapter concludes that for DRR to be effective it should be built on multi-

stakeholder partnerships. The key stakeholders are households, community, civil society organisations, government and external stakeholders. Enhancing the capacity of all stakeholders will better contribute to the implementation of effective DRR in communities.

7.2 Living with the risk of multiple hazards

The vulnerability of SIDS includes their exposure to multiple hazards. The Windward Islands have a history of being impacted by various hazards. The history of disasters is an indication that disasters are more than just the impact of natural hazards, but the interaction between nature and society. Research centres and institutions, such as the Seismic Research Centre (SRC) and the Caribbean Institute of Meteorology and Hydrology (CIMH), have through research helped to improve knowledge and understanding of these hazards. The Caribbean Disaster Emergency Response Agency and partner agencies have contributed to the framing of policies and programmes and have been able to secure financial support to help national disaster organisations address disaster risk reduction.

This study shows that while research, knowledge and information on hazards helps to frame policies, plans and warning systems, they are not sufficient to effectively reduce risk to hazards at the community level. This is because there are many factors, which affects the vulnerability of a society to hazards. This section will address how hazards have affected the Windward Islands of Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines in the past and the factors that contributed to the devastation they caused.

The four Windward Islands by nature of their seismicity, tropical location and topography are susceptible to hazards. The hazard profiles in Chapter 5 and the Appendix shows that the most common hazards include hurricanes and storms, earthquakes, landslides, volcanic activity and flooding. However, the frequency and severity of the impact vary for different hazards on each island. In addition, while the hazards that participants experienced and are worried about are similar, they vary by island.

Table 7.1 and 7.2 presents data on disaster impact and losses for the Windward Islands for different periods from 1900 up to 1997 adapted from Pelling and Uitto (2001) and from 1911 to 2011 developed from the fieldwork. The data consist mainly of disasters which result from natural hazards. Table 7.1 shows that the Windward Islands are not as disaster prone compared to Haiti one of the most disaster prone state in the Caribbean region. In relation to the four islands Dominica and Saint Lucia have had more hazard occurrences that St Vincent and the Grenadines and Grenada, which has the least occurrences over the period from 1900 to 2011. The Pelling and Uitto (2001) data also confirms the data in this study which shows that the number of disaster deaths is generally low but those affected is usually high and increasing shown as shown table 7.2.

Table 7.1: Disaster events, deaths and affected for the Anglophone Windward Islands compared with Bahamas and Haiti.

Country	**1900 – 1997**		**1987 – 1997**					**Total population**
	Events	**Deaths Total**	**Events**	**Deaths**		**Affected**		
				Total	**1000**	**Total**	**1000**	
Bahamas	13	48	4	0	-	0	-	300,000
Haiti	48	13,372	20	342	0.049	341,711	48.8	7,000,000
Dominica	11	2061	2	0	-	300	3.0	100,000
Grenada	4	6	1	0	-	0	-	100,000
Saint Lucia	12	64	4	5	0.05	78	0.8	100,000
St. Vincent and the Grenadines	11	1694	1	0	-	100	1.0	100,000

Adapted from Pelling and Uitto (2001)

Table 7.2: Disaster events, deaths and affected for the Anglophone Windward Islands from 1911 to 2011.

Anglophone Windward Islands	Events 1911 - 2011	Deaths		Affected		Total Population 2011
		Total	1000	Total	1000	
Dominica	42	147	2.06	119,227	1672.4	71,293
Grenada	18	535	5.18	82,900	802.3	103,328
Saint Lucia	50	327	1.88	169,855	977.8	*173,720
St. Vincent and the Grenadines	32	134	1.23	61,229	561.7	109,000

Population Data 2010, *2012 estimate per 1000 population (incidents /population*1000)

Source: Author

Tectonic processes, such as volcanic eruptions and earthquakes, have helped to shape the landforms of the Caribbean Region. The Caribbean Region is part of a system of plates which moves slowly in different directions causing the earth to fold and buckle (Potter et al., 2004). The Windward Islands are located at the eastern edge of the Caribbean plate in a subduction zone. At this zone, there is subduction of the South American plate beneath the Caribbean plate that has resulted in the formation of the Lesser Antilles volcanic island arc (Lindsay et al., 2005). This volcanic arc stretches from Saba in the north to Grenada in the south and includes all the Windward Islands. The interaction between tectonic plates produces areas that are characterised by volcanic activity and earthquakes.

The countries of the Eastern Caribbean are highly susceptible to earthquakes (SRC, no date). The findings of this research show that Dominica and Saint Lucia have a higher frequency of earthquake than Grenada and St Vincent and the Grenadines. The damage to Dominica from earthquakes is also more severe than on the other islands. The November 2004 earthquake measured 6.0 on the Richter Scale and caused widespread damage to the northern part of Dominica. The damage was estimated at EC$ 90 million (OECS, 2004). The history of earthquakes in the Caribbean region indicates that several islands can be affected by a single earthquake event. The earthquake of 29 November 2007 raised concerns throughout the entire region where the earthquake was felt. There was

damage to several islands and some scientists believe that the Eastern Caribbean is due for a large earthquake. The Caribbean region was not well prepared for the 2007 earthquake event, which prompted swift action to address the level of unpreparedness.

The Caribbean Earthquake Readiness programme improved institutional capacity and knowledge about earthquakes in the Caribbean. An example is the availability of more information for different stakeholders, which can be used in schools, government departments, communities and various age ranges. However there is no system in place to ensure dissemination and use of the information and as stated throughout this thesis having more information does is not a guarantee of better preparedness or DRR. In addition, there has been the development of earthquake contingency plans at the national level and simulation exercises to test national systems response to earthquakes. As in the case in many national programmes they do not trickle down to the community. There is little evidence from householders through the questionnaires that earthquake preparedness measures have been undertaken or are being considered. As discussed later in this chapter having more information does not translate to better preparedness

Risk reduction programmes are often left to disasters offices, but would be more effective if other departments and organisations collaborate more on such programmes. Most disaster offices in the Caribbean are understaffed which means that they have limited contact with local communities. However, other actors, such as agricultural extension officers, health care workers and faith-based leaders, have far greater connections with more people at the community level. These key people work closely with community members for example agricultural extensions officers support farmers in small subdivisions so they are well known and well respected. Due to their close relationships with local areas key people can advocate for the community and the community will likely take advice from them. As noted earlier such people can use their community relations for personal interest such as launching their political careers. Such relationships can become barriers to the adoption of DRR activities by some householder in the community. It could be argued that such people have enough to do as part of their jobs, but a

small amount of information on a regular basis and incorporated with agriculture, health and other related sectors can develop community capacity over time.

Apart from earthquakes, the islands in the Eastern Caribbean, volcanic arc consist of a single live volcano, except for Dominica that has nine active volcanoes. This makes Dominica very susceptible to volcanic activity. Seven of the nine volcanoes in Dominica are located on the southern end of the island, which is also the most populated area. In recent times, volcanic activity has occurred mainly in St Vincent, with little in Dominica and the underwater volcano off Grenada as discussed in more details in Chapter 4. These islands are likely to have eruptions in the future (Lindsay et al., 2005). Dominica has more live volcanoes than St Vincent and the Grenadines, the latter have had a higher frequency of eruptions between 1911 and 2011. This study found that less than 1 per cent of Dominican participants are worried about volcanic eruptions. While there is a history of minor volcanic earthquakes, the last major volcanic eruption was 500 years ago (SRC, no date). This has led to problems convincing people to prepare for earthquakes and volcanic hazards. The finding of this research shows that even though La Soufrière in St Vincent and the Grenadines experienced a minor eruption in 1971, people were no more prepared to evacuate during the 1979 eruption. The accounts below show that people in the high risk zone that were eventually evacuated initially went about their business as usual in 1979.

> *During the night I heard loud sounds and saw lights, the place was dark and at the time I thought that it was thunder and lightning from the bad weather. When I woke up in the morning I heard persons passing the road talking about the volcano erupting. I went outside someone called to me and said the volcano was erupting. I went about my business as usual taking the animals out to feed. While doing that I saw fire on the mountain, I was fascinated by what I was seeing and I was not scared as I did not know the danger at the time. My children came from town with vehicles for the grand children but I did not go with them. I did not go with them because by then the place had gotten clear and I thought it was over. Later a police came and said that my daughter had called to find out if I was still in the village. The police officer said if he was I, he would leave but he cannot leave because of his job. Ashes were everywhere it fell all over us, in our mouths and nose and it burned my eyes.*
> Personal Communication, Resident, Rose Hall, St Vincent.

The 73 years old Fancy, St. Vincent participant recalled:-

> *I was heading to the mountain to change my animals when I hear a blasting but I went anyway. By the time I reach home, the place was dark and a truck came to pick us up but I did not go, my wife and the children went. Some of us said we would walk the Sunday morning but the Saturday night a helicopter came. One of the other guy was so frighten he could not walk. The plane land on the field, we let the small ones go first. The plane made two trips and took us to Arnos Vale.* Fancy participant.

The 1979 eruption resulted in the evacuation of over 20,000 people and widespread damage to agriculture. The account from residents living in the high risk areas gives an indication of the limited knowledge about the danger of volcanic activity people had in 1979. There is more research and information available now, however there are discrepancies about how closely related are the links between access to more information and better preparedness is discussed later in this chapter. Volcanic hazard maps have been prepared for Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines. These maps are used in training to help people understand the different levels of alert and the areas that are at greatest risks. In St Vincent and the Grenadines, there has been much development since 1979 and while research is available, it was found during this research that the volcanic hazard plans need updating. In SVG there are annual activities to commemorate the 1979 eruption, but it is unclear whether people know what to do if the volcano erupts. There is need for a better feedback mechanism to measure level of knowledge and understanding of what to do for various hazards.

Research by the Soufrière Monitoring Unit in collaboration with Seismic Research Centre ensures that more information is available to citizens on volcanic hazards. However, there are no records of national assessments of the awareness of people to volcanic hazard risks. Therefore, it is difficult to tell how people would respond to a volcanic eruption. It is expected that people would respond more effectively if an eruption occur in the future. Notably there are more people with private transport and it is likely that there will be more people trying to drive in and out of the high risk zones.

Development and settlement in the Windward Islands are confined along coastal plains and hillsides. Agriculture is practiced mainly on hillsides. Research by the University of the West Indies (no date) confirms that much of the forest of the islands under study have been cleared for cultivation of crops. Soil which loosens from clearing large areas of natural vegetation for farming increases landslide potential. Better farming practices need to be undertaken to preserve hill slopes. Land preservation is especially critical since some farmers are trying to improve production of bananas and other crops. The improvement in production of bananas is to compensate for the increased market competition, challenges from diseases and the reduction in price of bananas on the international markets. A study by Wiltshire (2004) highlights some of the challenges facing Windward Islands banana trade.

Bananas in the Windward Islands are grown mainly on small hilly plots of lands with little use of agro chemicals. Bananas are affected by both rainy weather and dry weather. In comparison in Latin America, the conditions are quite different. Farming is done on more extensive and fertile lands, chemical usage is high and workers are low paid (Wiltshire, 2004). Lewis (1999) noted that dependence on a single crop is detrimental if that crop is affected. This increases economic vulnerability especially for small farmers and reinforces the double bind of poverty discussed later in this chapter.

A study of hazards by the University of the West Indies shows that landslides and other mass movement have caused widespread damage to the economic and social sectors in the Windward Islands (UWI, no date). Heavy rainfall is the predominant cause of landslides that lead to debris slide and debris flow landslides. The greatest potential for landslides is during the hurricane season. The finding shows that Saint Lucia has had the highest frequency of landslides that has resulted in deaths when compared to Dominica, Grenada and St Vincent and the Grenadines.

The greatest loss of life by landslides occurred in the Ravine Poisson landslide in Saint Lucia in 1938 when approximately 100 people were killed and 500 people were affected (NEMO Secretariat, 2006). The Black Mallet landslide in Saint Lucia

in September 1999 resulted in the relocation of 100 households to rented properties and then to a purpose built settlement which cost the government over US$ 6.5 million (UWI, no date). Saint Lucia was also affected by hundreds of dangerous landslides during hurricane Tomas 2010. (UNECLAC, 2011)

In the Windward Islands where the road network is limited, especially in mountainous areas, attempts to cut roads have weakened rock structures and exposed some areas to landslides (UWI, no date). An example of this is the construction of a major road in the southern part of Dominica, which resulted in slope failure near Bellvue Chopin. While the area has been stabilised, there is still the possibility that landslides will occur in the future. Even along roads in less steep areas, landslides are also common. This landslide potential was evident in 2008 when a retaining wall collapsed onto the main road in Ratho Mill, SVG crushing a passing vehicle and the passenger, see Figure 7.2. The NEMO report found that a tropical weather system produced consistent rainfall for over 24 hours. In total there were twenty five other landslides, flooding and blocked roads throughout St Vincent and the Grenadines (Prince, 2008). The Ratho Mill landslide is an example of the complex nature of landslides related to both nature and society.

Figure 7.2: Deadly landslide on St. Vincent in 2008

Source: NEMO

A number of underlying factors contribute to landsides in the Eastern Caribbean, especially in unplanned and squatter settlements. The factors include the lack of

proper drainage, removal of vegetation for home gardens and poor construction practices (Anderson et al., 2007; Carby et al., 2011). Anderson et al. (2007, p. 208) found that "Residents may well recognise the risks, but lack either appropriate design or build [ing] skills to adequately construct structures such as a retaining wall". These residents may also lack the finance to build these structures and hire qualified builders. Figure 7.2 shows that even in planned and wealthier settlements, the risk of landslide also exists. Information gathered from work at NEMO found that poor drainage was a contributing factor to property damage. This reinforces the connection between poverty and vulnerability, which forces people to make risky decisions by building anywhere and anyhow.

There is need for legislation to regulate development in high-risk areas, but as Alexander (2000) noted, people are already residing in high-risk areas. High risks areas should be identified and marked so that residents are aware of the risks they face. They would also be better able to determine the preparations needed to cope in those hazardous locations. This could include evacuation planning and where possible relocation. However, as noted above in the case of Black Mallet, Saint Lucia, relocation can be very costly. The cost is mostly on the government with other competing interest for the limited finances. The Caribbean implementation of HFA mid-term review reported that while land and building laws exist they are not enforced. This leads to further exposure to hazards such as flooding, landslides and earthquakes (Carby et al., 2011).

Landslides in the Windward Islands have caused damage to various sectors. Agriculture, in particular bananas, which are cultivated mainly on slopes, can be destroyed, resulting in significant losses to small farmers. Landslides have also damaged utilities and communication networks leaving people without water and electricity. People were left without water for up to six months after landslides triggered by a storm destroyed parts of the water lines on St Vincent (UWI, no date). Landslides have frequently cut off access to communities. Several communities became inaccessible in 2010 when Hurricane Tomas struck St Vincent and the Grenadines and St Lucia. Fond St. Jacques, Soufrière was cut off for days but as discussed in section 8, the recently formed community disaster

response team (CDRT) were able to take charge until further help arrived. This is a good example of community DRR.

Landslides have caused delays in the transportation of agricultural produce and prevented people from getting to work, school and other places. Even the slightest delay can mean a loss of income especially to small farmers. Roads must be cleared and in some instances, bridges repaired before access can be restored. Landslide events reinforce the importance of community based risk reduction programmes so that communities can plan and take action. In some communities, little has been done to mitigate landslides, such as improved development and improving drainage.

Anderson et al. (2007) have had much success with the implementation of the Management of Slope Stability in Communities (MoSSiaC) in the Eastern Caribbean. The programme was initiated in Saint Lucia in 2004 and has since been implemented in Dominica, St Vincent and the Grenadines and The British Virgin Islands. Landslide risk reduction through the MoSSiaC is addressed by empowering marginal and vulnerable communities to take ownership and implement slope stabilising processes with the support and assistance of the government and various other stakeholders. Anderson et al. (2007) reported the success of the MoSSiaC in reducing the rate of landslides in the communities where it was implemented. This includes Fond Cole in Dominica and Skate Town in Saint Lucia. The success was measured against rainfall in the communities based on similar or higher rates than would normally cause landslides or which caused landslide in similar areas where the project had not been implemented.

Despite landslides, posing high risks to their communities, only a few participants were worried about landslide risks. Landslide risks are often underestimated, especially as they are associated with triggers such as hurricanes and storms. Landslide mapping has been done for the study areas and is expected to be used in policy decision making. Similar to other hazards there has been improvements in research and mapping, but information is not well distributed and does very little to build community resilience.

Flooding is one of the most common hazards in the Caribbean Region. It is often referred to as the “Silent Killer”. Flooding occurs mainly during the hurricane season but can also occur outside of that period. Floods occur annually and inundate properties and destroy belonging. The Caribbean region, with the support of the Japanese Government, UWI and CIMH developed a regional flood hazard management programme. The aim of the project was to complete flood mapping and community disaster management planning. However, there are concerns that individual countries have not made much progress in implementation. Similar to landslide data, flood events for the study areas are not well documented.

Flooding is considered to be the most common and localised hazard in the Caribbean Region (Opadeyi, 2003). Several participants in Marquis, Grenada said that the flooding in a lowland area was related to housing development taking place further inland. The residents said that the area did not flood before the start of the housing development. As noted in Chapter 2 development can cause disaster risk. In the Windward Islands, most communities are exposed to hazards of one kind or the other. While there is much being done on preparedness, there is not enough in terms of mitigation and prevention at the community level, therefore the chances of disasters remain high.

The findings of this study confirm that tropical weather systems, such as hurricanes and storms, are responsible for the most damage in the Windward Islands. As noted earlier, flooding and landslides are very common and most are related to tropical weather systems. The Caribbean region is one of the six main tropical areas where hurricanes and related phenomena occur each year. Tropical weather systems affect an area in different ways depending on the characteristics of the system. The main damaging agents of a hurricane include strong winds, torrential rain and storm surges.

In relation to hurricanes, the findings of this study are similar to that of O’ Keefe and Conway 1977. In terms of the four Windward Islands in the study O’ Keefe and Conway noted that Dominica faces the greatest risk from hurricanes, as it is positioned higher in the hurricane belt (O’Keefe and Conway, 1977). Grenada, on

the other hand, is located further south and has a much lower hurricane and storm frequency (O'Keefe and Conway, 1977). This study shows that the higher latitudes experience higher tropical weather systems frequency. This means that both Saint Lucia and Dominica have higher storm frequency however, Saint Lucia seems to have had more occurrences. Other factors such as record keeping could account for the Saint Lucia higher records. This study found that Saint Lucia is better at collating records of disasters than Dominica, Grenada and St Vincent and the Grenadines.

St Vincent and the Grenadines located slightly further south than Saint Lucia has lower impacts of tropical weather systems. Grenada, which is the most southerly Windward Island, has the lowest frequency of impact of tropical weather systems such as hurricanes and storms. This knowledge could be responsible for the level of complacency that existed when hurricane Ivan devastated Grenada in 2004. People were unprepared for the havoc it wreaked, since the last major event had been from Hurricane Janet in 1955, but the island had experienced storms of lower impacts since that time.

This research found that most participants had experienced hurricanes and storms and those are the hazards that people are most concerned about. Despite these findings, Section 8.7 shows that people are still ill-prepared for hurricanes and storms. The damage caused by hurricanes is usually widespread, affecting mainly housing, agriculture, infrastructure and tourism. Lewis (1999) and others note that a single event can cause severe damage on an entire island. This pattern of destruction is still possible especially because of the size of islands compared to the likely impact of that single event.

The vulnerability of houses is linked to the socio-economic conditions of different islands. Research on hurricane Ivan in 2004 shows that damage to housing in Grenada was significantly more than on Cayman Islands, despite the Cayman Islands experiencing greater wind speed and storm surge (Prevatt et al., 2010). The roof sheeting is one of the most common parts of the structure to fail in hurricanes. The loss of the roof not only exposes the contents of the building to rain but it also compromises the integrity of the main walls of the building. The

Caribbean Development Bank attributes roof failure to “inadequate fastening devices, inadequate sheet thickness and insufficient frequencies of fasteners in the known areas of greater wind suction” (Caribbean Development Bank/CARICOM Secretariat, 2004, p. 105).

Building codes have been established to guide safer construction. This research found that few people used building codes to guide their construction. Several studies confirm that people, especially the poor, construct homes without the use of building codes (Manuel-Navarrete et al., 2007; CDEMA/UNDP, 2010). Many poor people construct their own homes or get assistance from community members. As Lewis (1999) noted, community self-help practices need to be integrated in DRR programmes. This integration is critical in the housing sector since many poor people construct their homes using family and community labour. Integrating building codes and guidelines into community programmes can enhance community DRR.

Living with hazards has become part of everyday life in the Windward Islands. This is very apparent for hurricanes and storms that are regular events but even more so with floods and landslides. People who depend on the sea or rivers for their livelihoods prefer to live near to these resources. They are prepared to live with risk because of the usefulness of these resources for their livelihoods. This view was evident in comments from participants, more so in St. Joseph, Dominica. Some Dominican participants indicate they live with the Layou River and run when it floods.

The Layou River is known for flooding and landslides of varying scales. The most recent was the declared ecological disaster in July 2011, a few days before the fieldwork began. In July 2011, a dam burst and destroyed homes, agriculture, bridges and other development projects in the Layou area. People seem to have accepted certain common hazards such as flooding and landslides. Participants in the Layou, Dominica area said, they just live with the river and hope that they live through any impact.

This research found that participants, who were impacted by hurricane Ivan (2004) and Emily (2005) in Grenada, rebuilt on the beachfront so that they would have quick and easy access to the sea. This was done even after they recalled that their homes were moved to the other side of the road by the hurricane events. Several participants from Soubise, Grenada suggested that the government should build a sea wall. They put mitigation in the hands of the authorities and seem to accept that on their own they cannot prepare for these hazards.

The Windward Islands are faced with a number of natural hazards and limited options in terms of where to settle because the topography limits the proportion of flat lands to the narrow coastal area. These areas are at risk from flooding and coastal hazards. On the other hand, the largest portions of these small islands consist of gently sloping to steep mountainous landscapes prone to landslides and other earth movements. The point is that in both cases risk-reduction measures are important for development on both types of landscapes. The reality is that social, economic and political processes will dictate the accessibility and availability of resources to take precautions against hazards. In the long term, some people and places will be more vulnerable than others. Those without access are the poor and marginalised so they will be at greater risk than the non-poor. Improved research and knowledge about hazards in the Caribbean have helped to informed policy decisions and improve warning on hazards but vulnerability is high in many communities.

The Windward Islands of Dominica, Grenada, Saint Lucia and St Vincent and the Grenadines are exposed to multiple hazards, which can cause disasters in these islands. Disasters are costly for government and affected residents especially for those who lose family members, homes and their livelihoods. The impacts are usually island wide or affect a significant proportion of islands, various sectors such as housing, tourism, agriculture and infrastructure. This requires that actions to reduce risks are undertaken by multiple stakeholders.

7.3 Poverty and Vulnerability

Vulnerability is inextricably linked to poverty and poverty is inextricably linked to low educational achievement, employability, household size and the risk reduction choices people are likely to make. These limitations make people powerless to inform decision making and undertake risk reduction measures. "...It is not disability or literacy alone that produces vulnerability. Rather it is the failure of society to recognize that a condition such as poverty means that you cannot mitigate risk, live in a safer location, or afford to evacuate when told to do so" (Phillips and Fordham, 2010).

Poverty is a lack of access to money and other means to satisfy basic needs (Encyclopaedia Britannica, 2013). Therefore, poverty is not just about money, but communities where people have limited viable economic options and limited access to services are likely to have high rates of poverty. Clearly, undertaking risk reduction measures would not be a priority when people are unable to fulfil their basic human needs. Poverty assessment reports show high levels of poverty in the study areas, in particular St Joseph parish in Dominica and Sandy Bay district, which includes Fancy in St Vincent. In addition to that, all four study areas have negative population growth. Soufrière, St Lucia with a growing tourism industry is the least densely populated parish in St Lucia.

High levels of poverty are evident in the way of life in the study areas. This research found that over 80 per cent of participants had no home insurance. In Grenada, it is almost 90 per cent. A lack of commercial insurance indicates income flow problems in communities that, compared to similar populations in Asia and Africa, would seem to be relatively well off in global terms. Reaching the poor is difficult and disasters can push people further below the poverty line. Lack of access to insurance or cash reserves slows the recovery process following hazards and increases vulnerability. The main reason stated for not insuring is the costs. The findings show that over half of the participants in the study area are either unemployed or have insecure employment. Farmers in Fancy, St Vincent complain about the stealing of their produce and lack of a proper market. According to one farmer

"We have to leave Fancy by three o'clock in the morning to reach Georgetown to get a space to sell. If we go later people already come to the market early and buy from those from close by, we have nowhere else to sell" Fancy Participant.

Fishers and craft makers in Soubise and Marquis, Grenada share similar concerns. One participant said:-

"When we go out to fish, we cannot catch much because if we don't get them sell we have no place to store them. We sell on the road because we have no stall" Soubise Participant.

One key informant from the area in relation to the need for a craft market said:-

"Marquis is the first town known for craft; we need something to boost the development of the community" Key Informant 12.

Poverty reduction and disaster risk reduction need to be addressed together. Such reduction strategies can address issues of poor people living in hazardous locations and their limited access to fewer resources to fund risk reduction. Development programmes have not been effective in addressing the overall needs of the poor which include income, housing, livelihood, land ownership and educational opportunities. In addition, there is a disconnect between programmes aimed at addressing DRR, poverty reduction and other socio economic issues.

The difficulties are compounded when the DRR agencies themselves start interventions from the perspective of the hazard itself, for example, hurricane warnings or flood mitigation. The qualitative information from key stakeholders together with a review of the content of training courses, suggests that people are not first, but last, in conventional DRR training. DRR is still event focussed, but DRR should focus more on reducing people risks.

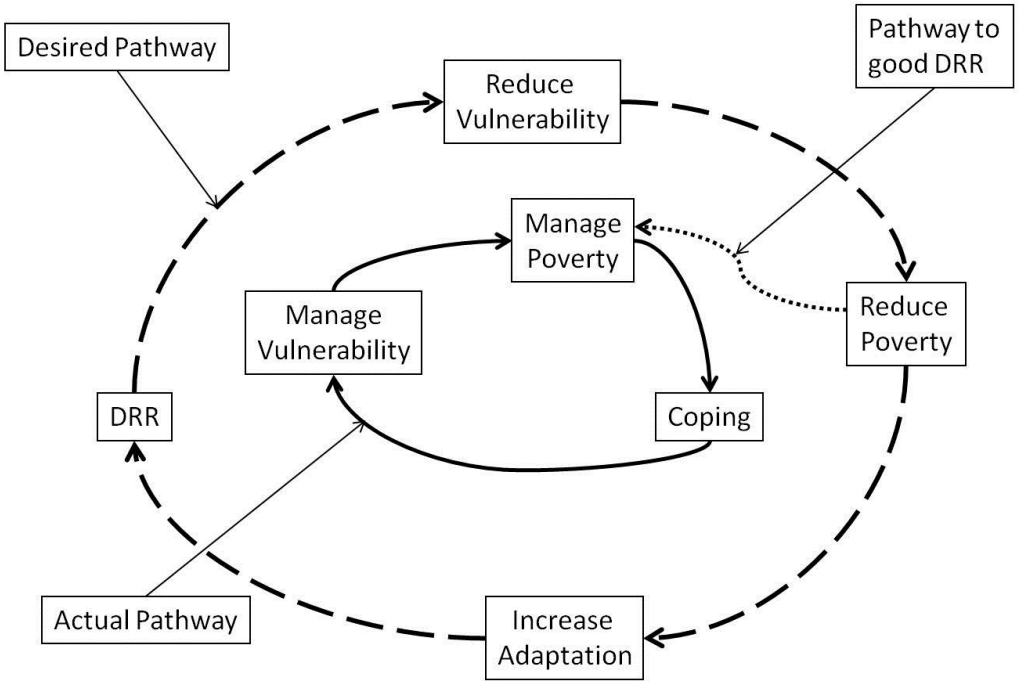
Poverty assessment reports for the Windward Islands show that poorer households are usually larger than wealthier households. Furthermore, unemployment is also higher among the poor. Large families with more dependents are more likely to be poor or vulnerable. Large households are often dependent on a few working adults for support. In many instances, they are employed in sectors affected by disasters or constrained by national and international financial performance. This implies that several people in the same

household can be out of work or earn minimum wages, which will limit their risk reduction choices and decision making power. In times of disasters, larger households can pose a greater level of responsibility or burden especially for evacuation. Morrow (1999) in a study done in the USA, found that large families consisting of many dependents such as the elderly, disabled and children had difficulty responding to emergencies. In Marquis, Grenada, many families are large and one extended family had 23 members. In another home, a mother indicated that she has nine (9) children to look after, with no father in the home. The country poverty reports show that single female households are also likely to be poorer.

Vulnerability is tied to two main factors that can result in a double bind of poverty, shown in Figure 7.3. The first bind is related to socio economic factors, which keep households and communities in a perpetual state of poverty. Their social cohesiveness limits the support from external stakeholders. When asked about problems in the community a few people in Fancy said they had no problems, while others mention that they only have problems when outsiders come into their community. A similar view was expressed in Marquis, Grenada. Having a negative view of outsiders can erode progress made in reducing community disaster risks. However, communities on their own cannot effectively reduce risks without some kind of external support.

The second bind is that poverty gives coping strategies that simultaneously allow management of disasters while prohibiting effective DRR to build a stronger resilient community. Quite simply existing coping mechanisms resist better DRR as shown in Figure 7.3. People in poverty are likely to have higher risks to life and livelihoods. People develop certain coping mechanisms that allow them to manage their poverty, but not reduce it. Poverty reduction and vulnerability reduction can be addressed through similar strategies

Figure 7.3: The Double bind of poverty.



Source: Author

The assumption in the natural hazards literature is that positive coping mechanisms can lead to improved adaptation. One example from Bangladesh is the adaptation of fishing boats by strengthening their hulls to cope with the increased number of sand bank collisions during storm surges (O'Brien et al., 2011). There are, of course, negative coping mechanisms, such as cutting down the larger trees on Mount Kilimanjaro in Tanzania to compensate for declining agricultural income, such activity accelerates environmental damage including, perhaps, accelerated climate change (O'Keefe et al., 2008).

A continuum of adaptation of rich and poor people can be taken for people in relation to disaster risk reduction. The poor are likely to focus on DRR activities for themselves and their families with support from their social networks while the rich are more likely to undertake mitigation through financial means such as good building practices and insurance, Figure 7.4.

Figure 7.4: The adaptation continuum

Source: Author

Poor communities are not always more vulnerable because they cope and recover by depending on each other and helping each other when faced with hazards. The close relationship that develops over time makes a difference. Poor households tend to be grouped together and have a rich network while rich communities usually have a poor network. Disaster risk reduction and development can benefit from the bonds that already exist in communities. It is often difficult to infiltrate close-knit communities. However such communities can be empowered to reduce risks to hazards by working through key and influential persons in the communities. A close-knit and empowered community can be more influential in guiding the decisions of their political representatives to address risk reduction and development concerns.

In the social capital literature, Putnam (2000) refers to this close relationship as bonding social capital. To connect with external stakeholders who will help build capacity Putnam (2000) suggest bridging social capital. Social capital is considered as a key source of community resilience (Wallis et al., 2004) as further in section 7.7 of this chapter. This research found examples where organisations have eroded the trust of community members. This loss of trust can weaken community bonds as well as their willingness to work with outside organisations.

It is not only that only poor people are vulnerable, but being poor increases the vulnerability of people to disasters. Poverty cuts across various social conditions, such as difference in age, gender and ability. Poverty is also linked to whether people can access educational opportunities and the type of jobs they are able to find. Some of these factors are discussed in the following sections.

7.4 Differential vulnerability of certain groups of people

Wisner et al. (2004) noted that there are characteristics of groups of people that make them more vulnerable to hazards than others. In the study areas, the disabled and the elderly were identified as being more vulnerable than others to the impact of hazards. Morrow (1999) in a study after hurricane Andrew in the USA, noted that certain groups of people were left vulnerable. These groups included the poor, elderly, women headed households and recent residents.

7.4.1 Gender disparities in the Windward Islands

Gender differences lead to differential vulnerabilities in disasters. Caribbean disaster management has become more gender sensitive in recent years. However, it is difficult to address the issue of gender in disasters while gender disparity remains an issue in everyday life. This research found that among the participants there was a much higher level of unemployment among females than males in the four study areas. As such women struggle more to recover from the impact of hazards. A number of reports on the Windward Islands show that there is gender disparity in economic status, employment and household headship, which affects decisions relating to hazards (LAC, 2005; CPA, 2008; Ellis, 2009). Data from the Windward Islands found that many single female-headed households were among the poorest people in society. In addition, these households are usually larger, with most members being children. Additionally, unemployment is higher among single mothers.

The high level of vulnerability among single mothers was brought to prominence in Grenada in the aftermath of hurricane Ivan in 2004 and hurricane Emily 2005. Many of the single mothers had to seek shelter and this led to them becoming dependent on the state or other family members for support (UNECLA, 2005). Morrow (1999) confirmed that globally the most notable gender disparity is in economic status, which renders single women and single female head households more vulnerable. Women in low wage employment receive less benefit in old age than men, which can make them more vulnerable in their old age. However older men are more likely to be living alone.

This study found that women possess capacity that is used in disasters. They are usually the ones assisting in shelters to provide care, especially for the elderly and disabled. They help with cooking and keeping the shelters tidy. Women are mostly left with the responsibility of caring for dependents, such as the elderly, children and disabled. This means that even if they want to find work after disasters, they are usually unable to do so because of their care giving role. In some islands like Dominica, there is a very large population of elderly people, the highest in the Caribbean. However, male dominated occupations are usually given more attention after disasters (Fordham, 2012). This was evident after the Asian Tsunami in 2004 where men benefited from the donation of fishing boats, but no similar intervention was made for women (Enarson, 2012). Reducing vulnerability of men and women in disasters in the Caribbean can be enhanced by conducting further research on gender and disasters.

UNECLAC (2005) reported that following the impact of Hurricane Ivan, 2004 in Grenada that both men and women lost their jobs, especially in the agriculture and tourism sectors. Men were able to find work in the construction industry. However, it was more difficult for women to find work and this affected their rate of recovery because they were out of work longer than the men. In Grenada, there were efforts to help women by teaching them skills so they could take part in reconstruction, a male dominated occupation (UNECLAC, 2005). The report suggested that there is need for changes in cultural attitudes to support adjustments in traditional employment roles. While this is a worthwhile

suggestion, it is unlikely to change the disparities in gender but may increase the vulnerability of women who may be paid less than men for the same job.

Gender vulnerability is not just about women and girls as some groups of men are highly vulnerable, for example, those involved in relief and response occupations. The 9/11 bombing of the World Trade Centre in 2001 led to the death of almost 400 fire fighters. A further 500 or more developed severe illnesses and had to take early retirement (New York Times, 2002). In addition, men usually do not like to seek help after traumatic events, which can lead to substance and domestic abuse (Enarson, 2012). This research cannot make further inferences on how people dealt with traumatic events, as this issue was not explored in details in this study. Poorer males are also very vulnerable, as most men feel an obligation to take care of their families. Not being able to do so can lead to further social problems. This can lead to domestic abuse, substance abuse, illegal drug trade and incarceration. Population statistics for the Windward Islands show that there are a larger number of men in prisons than women. This raises the question of how many of the single female headed households were connected to imprisoned men. However, this topic is outside the scope of this research.

Some of the unemployed males who were interviewed for this study said that they felt badly because they could not find work and were unable to support their families. Their conditions limit their capacity to make any meaningful risk reduction interventions. Lewis (1999) pointed out that vulnerability is not just about being poor but being powerless to address the poverty. UNECLAC (2005) found that men in Grenada drank more alcohol in the aftermath of hurricane Ivan as a means of dealing with the stress. The reported alluded to an increase in domestic abuse, but women were reluctant to talk about the issue (UNECLAC, 2005). It was suggested that women kept quiet about their domestic abuse because they were prioritising their vulnerabilities, so they play down the issue of domestic abuse to secure their food and shelter (UNECLAC, 2005). This is an indication that the double bind of poverty is also gendered.

Country assessment reports suggest that there is a differential vulnerability in the labour market of the four islands concerning males and females (CDB, 2007; Ellis,

2009). It was found that even when women are more qualified than men they are either unemployed or under-employed and received lower wages than men. In addition, the global financial crisis has deepened the economic crisis in the Caribbean and undercut the well-being of women in the region. These economic factors, together with other outcomes of gender inequality, such as the gender employment gap, the gender pay gap, occupational segregation and the burden of unpaid work, are contributing to the marginality of Caribbean women (UNDP, 2012). More research is needed to address groups of both men and women who are marginalised and are likely more vulnerable to hazards.

7.4.2 Vulnerability of the Disabled

This research found that disabled people are not considered separately from those without disabilities, as requiring specialised support to reduce disaster risks. The aim is not to stereotype people with disabilities, but if their needs are not considered, they can be overlooked for evacuation and care in times of disasters. Recognising that people with disability need special attention to help them reduce the impact of hazards is trying to ensure that they are not made more vulnerable.

> *...People with disability may encounter physical barriers or experience particular difficulties of communication that prevent them from reacting effectively to crisis situations and stop them from using the facilities and assistance made available to people who do not live with disabilities (Alexander, Gaillard and Wisner, 2012, p. 413).*

This research found that most participants had one or more disabled or other vulnerable persons in their homes. Family members had no plans in place for their disabled relatives in emergencies. One person indicated that she would have to leave her disabled teenage son behind if anything happened. Community DRR programmes can help to make provision for disabled people. However, this is often not often the case. Many DRR programmes do not cater for physically and mentally challenged people, whether living alone or with families. This is of concern, since the disabled may require specialist care at all stages of an emergency. In many instances, the number of people with a disability in a community is unknown and can affect evacuation and care when hazards occur.

Having disabled people in the home may even prevent carers and family members from evacuating. The findings show that participants are not clear on how to care for vulnerable people in times of disaster.

“There are many forms of disability including paraplegic, quadriplegic, deafness, blinds and defects of vision, mental illness and retardation, cerebral damage, stroke, senility, dementia and Alzheimer’s” (Alexander, Gaillard and Wisner, 2012, p. 414). Some form of disability may not be immediately visible or diagnosed and can affect the way people behave in emergencies. In some places, there is still a stigma attached to disability, so family members may isolate their disabled indoors. Without proper community programmes in place it would be difficult to know where disabled people live and the kind of support they need to prepare and cope with hazards.

Disabled people may not be able to evacuate because of lack of facilities to move them or care for them in shelters. In addition, shelters are usually not well prepared to handle disabled persons. The same can be said for people with serious or terminal illnesses such as HIV/Aids and cancer. Information on such people is available in the community health system, but this cannot be shared because of confidentiality. The involvement of the health care practitioners in community disaster programmes would strengthen community preparedness.

There are very few studies on disability in the Caribbean region. One study of St Lucia, St Vincent, Barbados and Trinidad found that in all areas disability is highest among older women (Schmid, 2008). The research found that disabled people are normally isolated and lack specialist equipment for ambulatory support. Typically, they had basic equipment such as a walker or cane. There is a need for more dialogue between organisations for the disabled, disabled people and their families and emergency organisations.

In 2010, the National Emergency Management Office incorporated disability as part of their DRR week of activities. The team provided training and information materials to help the institutions plan and reduce risk. The reception and

interaction was positive, but the dialogue needs to be maintained and strengthened.

7.4.3 Vulnerability of the Elderly

The elderly in the Windward Islands are also very vulnerable to hazards. The life expectancy in the study area is in the 70s and is slightly higher for women than men. "The elderly in particular have physical, economic and social vulnerabilities that result in unique challenges and subject them to greater harm, loss and difficulty in recovering from disasters" (Ngo, 2012, p. 447). Those elderly that do not have access to public transportation and cannot evacuate or function on their own are highly vulnerable. Boruff and Cutter (2007) found that in places with higher rates of elderly, retirees and disabled had a higher level of social vulnerability.

The elderly who live on their own, especially males, are even more vulnerable. If elderly people are not part of community emergency planning, they may not receive the right assistance before, during or after disasters, which could threaten their survival. In developed nations, such as Japan, the mortality rate of the elderly in recent disasters was very high (Herrmann et al., 2004). Even when the elderly have access to shelters, they are reluctant to go, as they fear the treatment they might receive in shelters. A PAHO (2012) study found that older people are reluctant to go to shelters. Some elderly participants said they preferred to stay at home and face the danger rather than having to sleep on the floor or be subjected to demeaning treatment. This research also found that participants and key informants noted that the lack of respect for the elderly was a problem in some communities. Traditionally older people were well respected in communities and many still are, but more so in rural than urban communities, where the structure is quite different.

In addition, some elderly people do not want to leave their possessions behind. An elderly participant in Grenada stayed behind during hurricane Ivan in 2004 to ensure that items in her house did not get soaked from a leaking roof. The elderly are also less likely to take risk reduction measures without the assistance of

others. Disasters can make the elderly more vulnerable if they lose all of their possessions. This can be devastating as they are no longer able to work and therefore are unlikely to be able to replace lost items. It is believed that post disaster stress might have contributed to increased death in the elderly in the weeks following the devastation of Grenada in 2004 by hurricane (PAHO, 2012). One participant in this study noted that old people died while in the shelter and had to be buried quickly.

"It is imperative to recognize that not all elderly are vulnerable or are vulnerable in the same way" (Ngo, 2012, p. 447). The elderly may have local knowledge and traditional coping skills that they can share with others. They are also capable of providing care and support in shelters. This view of the resourcefulness of older people has also been pointed out by the PAHO (2012) report. Community disaster planning should incorporate the elderly in ways that fit their abilities and ensure that their needs are met. A good example is the work of elderly associations in Philippines following typhoon Ketsana in 2009. Several elderly associations collaborated in providing relief and recovery (Help Age International, 2011). The support provided by the associations involved was effective because the group had prior knowledge of the community and the kind of support that was needed. They also motivated the elderly people who were affected and received assistance to start old people's associations in their communities to help them prepare for disasters (Help Age International, 2011).

A new group of vulnerable people that is emerging in the Caribbean region is returning residents. These returning residents have spent many years living and working away from their native island, either on other islands or in more developed countries, such as the USA and UK. Visits home are infrequent and short for many emigrants. Some emigrants eventually return to an unfamiliar environment and community dynamics, which increases their level of vulnerability. They may receive pensions from overseas so financially they might be secure, but are nonetheless vulnerable. They may not fit in well with close-knit communities that exist in the Caribbean. Boruff and Cutter (2007) in a study of vulnerability in St Vincent and Barbados found that many retirees in an area contributed to the high levels of social vulnerability. Returning residents who are retirees are therefore

vulnerable in two ways. They are retired and have moved back to their native land but to one which is different to when they left. This research did not focus on the vulnerability of returning residents, but it is an issue which future research should address. However, parallel work done in Nepal suggests that coping mechanisms of in-migrants from significantly different environmental backgrounds can be inappropriate (Aryal, 2012).

The elderly and disabled need help to assess their vulnerabilities and help enhance their capacity to reduce risks to hazards. In addition, they need to be integrated into community networks that will ensure that support is available to aid evacuation and care in shelters. In the Philippines the establishment of old people's groups shows how the elderly can be better integrated in community DRR, not just as people who need help but those that have knowledge and experience. Older people could have knowledge of traditional coping mechanisms that they can share with their community.

7.5 Education and Livelihood Options

Educational achievement is linked to livelihood choices and the wages people are likely to earn. The level of literacy affects a person's ability to understand and make use of hazard related information. During the fieldwork, it was observed that participants were reluctant to participate because they had difficulty reading the questionnaire. This was more evident when neighbours or even other family members were present. When participants were separated from others, they were more willing to listen to the questions, select their answers and provide feedback to open ended questions. They were, however, more responsive where options were available for them to choose as opposed to them giving their opinions.

In relation to the question about decision-making in the community, it became clear that people felt that their opinions did not really matter in decision-making. One participant commented:-

"I don't contribute because educated people don't listen" Layou, Dominica Participant.

Others said that no one ever asked their opinions, while some people were happy with the community leader and politicians making the decisions about their community. Educational achievement can play a role in how confident people are about participating in community development activities. This reinforces the second bind referred to in Figure 7.3.

In most cases low levels of educational achievement result in low paid employment. This study shows that among participants the highest level of unemployment was mainly those who had attained only up to primary level education. However, in Small Island Developing States where unemployment is generally high, many educated people may be unemployed or under employed. This was also evident from participants where about 13 per cent of the unemployed in Grenada had college level education. Unemployment is an important indicator of vulnerability and is linked to poverty. Lack of employment makes people dependent and limits their access and ability to take care of basic needs. It also affects their ability to prepare and recover from the impacts of hazards. It is clear that certain occupations can be more adversely affected than others. Unemployment was identified as one of the main problems affecting the four study areas. As stated earlier in this chapter unemployment is particularly high among single women and young people. This makes women more vulnerable since they are often employed in more low paid and informal jobs and responsible for care giving.

As noted in section 8.3 farmers in the Fancy study have limited access to local markets and they complained about not being able to get a fair price for their produce. In addition, bananas are affected by international market pressures and pest and diseases such as the mealy bug and black sigatoca, which threatens the security of their livelihoods. Many of these farmers have only achieved a primary education and the employment opportunities in the community are limited. Opportunities to make better use of local produce can provide some diversity. The Fancy farmers coop made farine from cassava and make other local foods, but could not maintain the industry due to financial and other challenges. In such

areas the support from outside agencies can be helpful to guide community members.

Manuel-Navarrete et al. (2007) found that hurricanes caused significant economic setbacks within the livelihood activities practiced by the poorest people in society. These include farmers, fishers, hotel workers and craft makers. There is a need for more effort on creating diverse and secure livelihood options in communities that are highly dependent on agriculture and tourism. People in communities with limited livelihood options are faced with difficult choices including choosing to stay in their communities and be satisfied with the living standards their livelihoods afford them or moving to more economically viable communities. The choice to move poses new challenges. People who move are forced to either live in overcrowded accommodations, squat on crown lands or pay high rent. The move may also cause family breakdown, especially if one parent moves and the other stays in the community of origin with the children. Increased employment opportunities, better housing and increased institutional and structural systems may potentially reduce the level of vulnerability of individuals and groups (Cutter, Boruff and Shiley, 2003; Wisner et al., 2004).

Education and livelihood makes a difference to the options people have in reducing risks to disasters. The less educated are more likely to be unemployed, but in places where unemployment is high, people with varying levels of higher education are sometimes unemployed. Unemployment and employment in high-risk employment sectors increases vulnerability. Most risk reduction strategies require reading and people are unlikely to let others know they cannot read. Community literacy programmes can help to enhance the ability to make use of risk reduction information. In addition, the educational curriculum needs to fully incorporate DRR.

7.6 Factors Affecting Household Preparedness

There are a number of assumptions related to disaster preparedness. They include the assumption that prior, recent and frequent experience makes people more prepared. It also includes the assumption that living in a hazardous location

or close to a hazard makes people more prepared. There is also the belief that providing a lot of information and training to people is likely to make them more prepared.

In a study of residents in hurricane prone areas of Florida, Kapucu (2008) found that residents were generally unprepared. The study showed that even those people who felt they were prepared were actually ill prepared because of the limited or basic preparedness measures undertaken. This is similar to the findings of this study where preparedness was low especially in Dominica and Grenada. It was slightly higher in Saint Lucia and St Vincent, which had more recent disaster experience. This suggests that preparedness is related to experience but the level of relevance is low. Preparedness was, however, basic, short term and done at the last minute. This increases vulnerability since people are more likely to take risky decisions during hazards, endangering their lives and that of others.

The fieldwork carried out in the Windward Islands indicates that having access to a lot of information does not make people more prepared. Participants are aware of the hazards to which they are exposed and many worry about being affected by hazards. Despite this awareness the data suggests low rate of preparedness among participants. In addition, those who did prepare undertook only basic disaster preparedness measures. Approximately 99 per cent of the respondents claimed they received information from one or more sources on preparedness. These include workshops, community meetings, information leaflets, print media, radio and television. The television and radio accounted for over 60 per cent of the responses. These mediums are quite useful and popular sources of information, but they do not offer much opportunity for interaction with households.

Television provides an avenue for people to see first-hand how disasters affect the lives of people in other places. Some participants said that their worries about hazards are influenced by what they see on television. It is reasonable to assume that when people see how hazards affect other places, it would encourage them to be more prepared. However, findings from this research show that this is not the case. Over 85 per cent of the participants said that the information they received is generally good. In relation to preparedness, it appears as though providing

people with information does little to make them more prepared. Preparedness is low even where risk and recent experience of disasters is high (Paton 2006). The decision to act depends on whether people believe the occurrence of the hazard will be harmful to them and if it is beneficial to prepare.

There is a need to make disaster preparedness more about the community and incorporate community health care, churches, parent teachers associations and community groups and activities. Preparedness materials need to be more decentralised and made available at community locations such as schools, police stations, community centres, post offices and other public spaces in various formats. These could include posters, video clips, billboards, and banners. Disaster preparedness should be integrated as part of the local culture. Training programmes should be more practical and engage people in activities that result in community assessment, mapping and developing solutions to community problems. There should be discussions in interest groups and work places and better use of social networks in discussing issues relating to hazard risks. The data collected shows clearly that having access to lots of information does not mean increased preparedness. There are however a number of factors that can influence the level of adaption of risk reduction measures. As noted by Rogers (2003) diffusion of innovation theory, even when an innovation has obvious benefits, the adoption of these ideas can be slow.

The way new ideas are communicated is important and can affect the rate at which the ideas are adopted. Communication involves the process of creating and sharing ideas to arrive at mutual understanding (Rogers, 2003). The main ways risk reduction initiatives are communicated includes radio and television programmes, workshops and conferences, newspaper articles and public forums. Understanding the benefits of new initiatives should also change behaviour. Rodgers (2003) noted that sometimes it is expected that innovations will sell themselves, because of the likely benefits. In places prone to hazards, the assumption is made that because taking certain precautions will increase safety, that people will be willing to adopt such measures. However, there are many examples of how people live in dangerous locations, even when the risk of harm is very likely. Certain traditions and cultural practices that people adhere to can

affect the acceptance of new ideas if they are contrary to what people believe. In other instances, they may not trust the source of the new idea or the source may not be very influential in the community. The researcher's MSc thesis asked people about their preferred and trusted source of disaster information. Some 54 per cent said the disaster coordinator. However, the range of other sources included the Prime Minister or constituency representative, prominent people in society and radio announcers. Very few people (14 per cent) said that the source of the information did not matter.

There are innovations, such as building codes, which people associate with increased costs if they are used. If people perceive the cost of new ideas as being higher than existing options, they are unlikely to use them despite the potential benefits. The point is that the actual cost or long-term cost might be less, but how do you get that message to the majority of people? This can be quite a challenge if their social situation places them in a position where other aspects of life matter more than a hazard that may never occur. The way that interventions are introduced to communities and the level of involvement of the community can make a difference in the success of risk reduction programmes. Anderson et al. (2007) achieved much success with the Management of Slope Stability in Communities (MoSSiaC) programme. This programme was launched in Saint Lucia in 2004 and highlights the used of multiple stakeholders, low cost and effective landslide risk reduction in vulnerable communities. Both the physical and social aspect of the landslide was addressed by controlling surface water and community wellbeing. The community was consulted and engaged in the process from the beginning to the end.

The community based disaster programme area is broad and too important for one person to be effective. There is not enough political will at the decision-making level in some departments, which means that the emergency management office takes on all the responsibilities for the organisation. The national DRR programme should be a partnership between key sectors to address physical, social and economic vulnerabilities in the context of national development. The national disaster plan already identify a number of subcommittees with related responsibilities which if undertaken will more effective in DRR.

Other organisations may be in a better position to interface with community organisations, such as community development departments. To date, it is a challenge to get community organisation to be proactive on disaster risk reduction initiatives. They are good at responding and this influences how they are viewed by the community. However, there are good examples, such as the landslide mitigation programme, that verifies that community based initiatives can be effective.

7.7 Social Capital and Community Cohesion

The second objective of this research was designed to identity existing capacity at the household and community level aimed at reducing risk to hazards in the Windward Islands. Strong social capital is important in any DRR programme. Social capital is considered as a source of capacity in planning and responding to hazards (Murphy, 2007). Social capital draws the community close together through formal and informal associations. Generally, people help each other in times of disasters. They help to take people to shelters, manage shelters, repair damaged structures, clear drains and whatever they could do in the short term.

Despite the gender disparities highlighted earlier in section 8.4, some researchers (UNECLAC, 2005) found that in communities where there is strong social capital, the relationship between men and women in disasters could be complementary. This was evident after hurricane Emily impacted Grenada in 2005. The experience of hurricane Ivan in 2004 may have had an influence on their community actions. UNECLAC (2005) noted that “The resilience of men and women was evidenced through the ‘marooning’ of men to rebuild homes and the techniques used by women to reduce fear among the children such as storytelling, organising games, sing-songs and providing dignity and coherence to community life through the one-pot cooks”. Jayawickrama (2010) has championed such community activity as using known cultural assets in post disaster recovery.

Pelling (2002) argues that social capital alone does not shape the outcomes of social vulnerability. However, because it affects access to social assets, such as

political power, and representation, patterns of reciprocity and exclusion and institutional beliefs and customs, it becomes an important determinant of social vulnerability. Strong social capital in a community contributes to the capacity of a community to respond to, cope with and recover from the impact of hazards. Remote and poorer communities have stronger social capital and cope better than other communities. The results show that, in general, there is a high level of social cohesion in the Windward Island study areas, with the highest levels in Fancy.

In Grenada after hurricane Ivan 2004, communities such as Après Tout where there are strong social bonds, cleared roads, replaced roofs, rebuilt homes and advanced the recovery of the community. The opposite was visible in less well-connected communities (UNECLAC, 2005). Such bonds can represent an important source of DRR capacity. The focus group discussions gathered that many people sought refuge with neighbours and relatives during and after hurricane Ivan 2004. They preferred this option rather than going to shelters. They felt better even if the place they were taking shelter was damaged and they all had to share a single room. They gained strength from being with loved ones.

It can also be argued that strong community cohesion enhances the capacity of a community to deal hazards. This cohesion is being threatened by politics, which divides many communities and causes a breakdown of important relationships. Pelling (2002) warns that social capital can be used to gain power over others. UNECLAC (2005) reported that people in Grenada said that they did not get the supplies they needed because of politics. This research found similar sentiments expressed in all the study areas, in particular St Vincent and St Lucia, which were still recovering from hurricane Tomas in 2010.

Emerging social trends such as substance abuse and violence, especially among youths, also erodes existing community cohesion. UNECLAC (2005) noted that policy makers should aim to strengthen existing bonds in communities while trying to create and strengthened bonds in communities where it is weak or lacking. Social networks, such as the church, clubs and community groups can be used as avenues to build community resilience. NEMO, St Vincent has been invited to several churches to make presentations on family disaster preparedness to their

members. Similarly, faith based organisations are usually instrumental in sourcing relief from their wider networks to support communities after disasters.

Women farmers in cooperative networks share ideas and information on markets and materials as they rebuild their holdings. Fishers in cooperatives also benefited from small grants to replace their equipment. In all the study areas in the Windward Islands there are small cooperatives operating, including farmers and fishers. Community cooperatives have been instrumental in providing support after disasters, but this is usually quite small in relation to what is required for recovery. Communities that are constantly impacted by adverse events also struggle to build resilience.

Conventional thinking tells us that without a strong institutional framework aimed at supporting communities and building the community resilience to respond to, and cope with disastrous events will be undermined. The lack of financial resources hampers the development of community organisations that can focus on DRR, despite the high levels of hazards, especially hurricanes. The hurricane threat is likely to increase as research by Hansen et al.(2012) suggest that climate change will mean that, globally, storms will increase in frequency and severity.

However, this research has found that one community, Fancy, which lacks the kind of institutional support needed for building resilience, has done so of its own accord. This is evidenced by its post hurricane damage reporting and the strong social ties shown from the survey. Fancy is also very vulnerable as livelihoods are dominated by the primary sector and there are high levels of unemployment. There appears to be an inverse relation with the promotion of good DRR and poverty. This suggests that poor communities that cannot afford to lose the little they have are more focused on protecting what they do have. This does not mean that strong partnership working is not needed, but it does mean that partnership working could learn the lessons from the Fancy community on what factors are needed for effective resilience building.

7.8 The Effectiveness of Community Programmes to DRR

The third objective of this research focused on the effectiveness of community programmes in reducing risk to hazards in the Windward Islands. To achieve these objective twenty-four key informants were interviewed. The key informants represented eleven (11) government departments, six (6) NGOs, and seven (7) CBOs involved in disaster and development in the Windward Islands. Phillips (2010) noted that factors such as commitment, capacity, age and size of the institution are factors that determine the effectiveness of the organisation. This study also found that the type of programmes and the level of collaboration with national and regional organisation were important factors.

The literature confirmed that civil society organisations involvement in DRR is essential as they represent an intermediary between the state and the family. Their involvement is important, especially in SIDS, because government alone own cannot foster community development. Many communities are neglected by central government, especially those with limited development options that cannot be used to boost foreign exchange either through tourism or foreign investments. While there are only a few NGOs operating in the Windward Islands, there are many other formal and informal organisations such as service clubs, faith based organisations, health groups and cultural and sports organisations.

While community organisations are widespread in the Windward Islands, some communities have only a few. In addition, the ones in the community may not be very active or are limited in what they can do to promote community development and reduce disaster risks. There have been mixed successes in the disaster and development programmes as stated by the key informants interviewed. The focus of community development and DRR programmes are related to training and skills development. There are also on going scholarship programmes in some community organisations to provide assistance in education and improved literacy in communities. Such assistance is limited to small groups of mainly school age children. More support is needed for communities with high levels of illiteracy and poverty, especially for people who are no longer of school age. They include people in occupations such as domestic chores, craft industry, farming, fishing and

informal sectors. Improved access to literacy will enhance their occupational opportunities and their knowledge and understanding of disaster related information.

The experience during the data collection where people were clearly reluctant to participate because they could not read raise concerns about the distribution of risk reduction materials. The lack of preparations in some cases could be related to people not understanding the information provided in brochures. Hence, programmes, such as the distribution of family emergency preparedness plans, can be quite ineffective in risk reduction.

Many communities practice environmental enhancement by cleaning rivers and beaches. These are all relevant and important programmes but there is need for more long term and widespread community programmes. The lack of long term strategic planning and a lack of clear goals and objectives in some organisations seem to hinder their overall ability to perform well. The inability to perform well is evident in the one-off projects that do not reach many people in the community and the limited collaboration with other groups and organisations in a community. Collaboration with other organisations can strengthen weak organisations and they can learn from better organised and well-connected organisations to help them overcome their own weaknesses.

In programmes that are specific to DRR the main intervention includes training in disaster management subjects areas including the following:-

- Damage Assessment and Needs Analysis
- Shelter and Shelter Management
- First Aid
- Family Disaster Preparedness
- Mass Casualty Management
- Vulnerability and Capacity Assessment
- Disaster Management
- Disaster Preparedness
- Initial Damage Assessment

Challenges highlighted by key informants concerning the disaster related training programmes include the fast turnover of trained volunteers. Despite the training of shelter management teams, many participants complain about negative experiences at shelters. It should be noted that those who have been trained are not always available or accessible in the event of hazards. In some cases, they themselves have been impacted by the hazards and must look after their own family needs.

Having worked with the training teams in SVG on some disaster management courses it was observed that there is need for a more systematic way of selecting community participants for training. There are often many repeat attendees on some programmes and while this reinforces knowledge, it gives the impression that there are more people trained than there actually are. Training needs to be more widespread in communities and involve people at different age and social status. Many youth clubs and organisations can incorporate disaster training in their programmes. The St Vincent and the Grenadines Cadet Force has done so successfully and members are actively involved in national emergencies when they occur. Other youth organisations have irregular training in disaster management and consequently are not as effective.

The findings of this research show that people are more willing to attend training if it is offered in their communities. Most training programmes are held in cities and towns, which means that people have to travel outside of their communities to attend training. In many instances, participants are refunded their transportation costs, but there are other factors that may influence their attendance. This includes not being able to take an entire day away from their occupation, especially if they work in the field or even if they are self-employed. In Dominica, one of the challenges noted by key informants was that people had difficulty getting time off, especially if training lasted more than one day.

In addition, trainers should be able to impart training to people who may be at varying educational levels. National disaster management programmes need to develop a core of local trainers who will take training to communities at a time and level that best meets the training needs of people in the community. There are

also similar courses offered by different organisations but there is need for collaboration to ensure content is the same and that training is delivered effectively.

Communities with weak institutional capacity, living in high-risk locations, with limited assets and resources are likely to find it difficult to deal with the impact of hazards. After hurricane Tomas in 2010, the Community Disaster Response Team (CDRT) in Soufriere took charge of various tasks in the Fond St. Jacques community (Harribans and Kathryn 2011). The CDRT evacuated people, conducted damage assessments, managed shelters and reported to the authorities. They had to rely on the training they received because the community was cut off from other parts of the island for days. Disaster management is a good DRR practice and helps households and communities prepare and respond better to hazards. It can be even more beneficial and promote community resilience if it is more systematic and organised to meet the needs of the wider community.

Organisations are faced with the challenges of human and financial constraints but many still work in isolation from other organisations that are working in the same community. They can benefit from collaborating with others, pooling resources and making the best use of their expert knowledge. Some organisations have good working relationships with the communities and community members are involved in different ways. The programmes and achievements do not receive much input from communities in particular at inception. The landslide MoSSiaC programme underscored the importance of the community involved from beginning to end so they can take ownership of community programmes and manage them when the project has ended.

This research found that in some communities there are competing interests, especially where one organisation was able to provide the community with supplies that another organisation was unable to provide. There is loyalty to the donor organisation. This can create rivalry and can set back the progress in some areas of a community. It is common to hear people say we do not want to hear anything from an organisation since they do not deliver on their promises. It is noted that communities need to guard against becoming too dependent on

external assistance and lose the significance of community based initiatives. Community development and disaster programmes should help to unite communities. This, however, does not mean keeping organisations out the community, but does mean that interventions are needed to bring people together and address the needs gap in the community. They should build on the strong bonds that exist in communities without weakening them. Where no bonds exist, efforts should be made to create bonds. Many times organisations re-invent the wheel and focus on one section of a community and not on others causing community fragmentation that creates, rather than solves, problems.

Community initiatives also need to guard against influential members in the community who may try to persuade organisations to work in certain parts of a community for selfish or politically motivated reasons. This can weaken social networks in the community. It is understood that civil society organisations may not always have the community interest at heart and may be politically driven which can be problematic (Commonwealth Secretariat, 2000). This can cause serious tension in communities, as is the case in one of the study communities, where one participant said they would not attend a focus group discussion if another participant was present. This reinforces the point made by Rogers (2003) that the messenger is just as important as the message being communicated. Politically motivated people or organisations can cause important risk reduction messages to be ignored by community members. This study found that both household participants and key informants cited political interference as problems hindering community development and disaster related programmes.

This study contends that after the initial launching of some risk reduction programmes they are not continued, so they do not remain important to people. There is also need to follow-up at the community level after national risk reduction programmes to help householders understand how they can make use of disaster related information in building their resilience. In light of the interviews with key informants, funding risk reduction is costly and not usually budgeted for locally. Interview findings also show some institutions in particular disaster offices are constrained by limited staff. Human and financial resource constraints were cited as the main challenges hindering the implementation of community programmes.

Financial capacity is the biggest challenge as access to finance can improve access to human capital, although this is not always the case.

Civil society organisations are an important part of community disaster and development programmes, but they must be empowered to be more effective. Some organisations do not have long-term strategic plans, which can affect their ability to engage communities in long-term development planning. Programmes could be ad-hoc and based on the funding they could get from donors. As Anderson (2006) pointed out, such funding can have criteria and timing that restricts what could be done in communities.

Good DRR programmes need to be maintained and shared with other communities with similar issues in the Windward Islands and with similar exposure and social factors. In some cases, communities may want to bring people from other islands to share good practices, which can be costly. Fundraising for such activities has proven to be difficult, time consuming and insufficient. Government subvention is small, as noted by one key informant, it is not even enough to cover administrative costs. Other CBO's might be reluctant to take government funding in cases where it can affect the relationship with the community. It is believed in some cases that government controls civil society organisations, which can have an effect on their relationship with the community. A lack of trust from communities can be counterproductive to the functioning of community-based organisations.

AR4 (IPCC, 2007) makes it clear that vulnerability assessments and risk reduction measures should not be a one- off, but a continuous process. Many risk reduction programmes are ineffective because once completed it is assumed that that is the end, changes are made, people have been helped and they move on to the next community. Vulnerability is not static; neither should disaster risk reduction be static.

Risk reduction messages can be incorporated into the culture and livelihood of a community. An extension officer can relate hazards to farming practices. A health care practitioner can link preparedness to health care especially for the elderly,

children and the disabled. The finding of the study shows that some participants include medication as part of their preparedness kits. Future studies can be undertaken to find out the level of planning and preparedness householders actually make for specific hazards in different communities. This would require that people assess their homes and environment, including the location and quality of construction of their homes as well as personal status. This is not to say that worthwhile improvements have not taken place in relation to disaster risk management. There have been improvements in the disaster management frameworks and legislation internationally, regionally and nationally. There have also been improvements in terms of technology, warning and information dissemination as well as institutional capacity. However, these processes have been slow in bringing lasting changes at the community levels.

Addressing DRR without addressing factors that contribute to vulnerability such as poverty, education, land ownership, livelihood are unlikely to build community resilience. This is especially so since current DRR is being treated like a single-loop learning process. Programmes are implemented without much assessment to measure level of adoption and adaption, which can be used to adjust or change strategies to focus on community. This will facilitate double-loop learning. This chapter concludes that for DRR to be effective it should be built on partnership between households, the community, civil society organisations and government. Enhancing the capacity of each stakeholder will better contribute to the implementation of effective DRR in communities. In the Windward Islands, the focus has been on enhancing institutional capacity, mainly at the government level. Therefore, national disaster organisations have access to up-to-date information and tools to plan and make decisions about hazard risks, but they lack the human and financial capacity to reach communities. This gap is often filled by civil society organisations and community based groups, which should be able to filter information down to individuals and households. Civil society faces similar resource challenges, but those that are networked have access to resources that should ensure continuity of operations and sustainable community development. In poor communities that do not expect much “Breaking the barrier of low expectation and anticipation is the central starting point for effective DRR” Ferdinand et al. (2012).

Empowering civil society organisations to support community development can contribute to better DRR initiatives. Inter-agency collaboration can make use of limited resources and allow organisations to focus on parts of programmes where their capacity is greatest and leave other areas to other organisations. Community programmes also need to be designed around community needs based on collaborative assessments with communities as active partners from initiation and after implementation.

7.9 Conclusion

This chapter discussed the findings presented in Chapters 5 and 6 with reference to the literature review in Chapters 2 and 4. The research has found that current DRR initiatives are inadequate in reducing risks to hazards at the community level in the Windward Islands. This is because communities are susceptible to physical as well as social vulnerability factors. Exposure to natural events cannot be eliminated, but the vulnerability of people to hazards can be addressed by enhancing the capacity of people to respond to, and cope with, disruptive events. The Windward Islands, by nature of their SIDS status are generally vulnerable, but their smallness can be a critical asset to building resilience and reducing risk to hazards. This process will require a systematic effort to identify and reduce vulnerability and build capacity to respond to, cope with, and recover from hazards without causing disasters.

Measures are needed to ensure that people and properties are not carelessly placed in harm's way. This study underscores the importance of understanding the overall vulnerability of a place to effectively reduce risks and build resilience. The assessments of physical and socio-economic factors affecting vulnerability are equally important for DRR. The assessments identify not only the vulnerability but also the capacities that are needed to build resilience. Capacity in relation to hazards has to do with the ability to respond to, and cope with, hazards. However, while households, communities and organisations may be able to respond to, cope with, and recover from the impact of hazards they may still lack resilience. People still see all activities relating to disasters as preparedness. Government, they

claim, is not prepared to invest in mitigation. This has implications for the use of building codes as many homes are built by self-help and community assistance. If anything community DRR programmes have to be part of a larger well-integrated education and awareness drive.

The poor who own very little cannot afford to lose the little that they do own. They may receive emergency relief, but they remain in poverty or in worse conditions than they were before. Some may even be given homes by the government, but may still lack understanding of how to ensure it is maintained and other safe practices such as drainage are in place. This only accounts for a few who are lucky to receive a home, but many more will remain in the double bind of poverty until there are collaborative efforts to reduce poverty, reduce vulnerability and build community resilience. Reducing vulnerability and building community resilience is multi-dimensional and for it to be effective it requires investment in programmes at all sectors in society and integration between multi-stakeholders. Overall, there has to be integration of DRR and development both at the community level and nationally. Progress in one area contributes to progress in the other, which promotes sustainable development.

CHAPTER EIGHT

8 Conclusions and Propositions: Building a Culture of Safety through Community DRR

8.1 Introduction

The Windward Islands are vulnerable to a number of natural hazards. This thesis examined the possibilities for Disaster Risk Reduction (DRR) in the Windward Islands. The Windward Islands offer a special case of "Island Vulnerability". Island vulnerability is essentially defined as an increased probability in disaster events against what would be expected if vulnerability were to be measured against international levels of poverty, defined as Gross National Product per capita. There are three reasons for this namely the topography of islands, the site characteristics and the socio-economic setting. The topography is one where islands, largely of volcanic or coral origins, face multi-hazard experience particularly from flooding and storm surge. The site issue is that islands usually have a high ratio of coastline to land mass implying a relatively higher exposure to extreme events. The socio-economic conditions are peculiar to island including isolation, mono-agriculture and mono-industry essentially laid down by colonial experience, an absence of formal employment opportunity and weak capacity in local governance including the absence of NGOs.

The research finds that vulnerability and poverty are closely linked in the Windward Islands. Efforts to enhance community development and build resilience are not effective as they fail to address fully community needs. This research concluded that some communities are more vulnerable than others and a major contributor to their vulnerability is poverty. None of the methods used in this research are unique to island vulnerability analysis as they have been applied elsewhere in DRR. What is unique is the scoping of the application of these methods to gain an overview of DRR possibilities. What emerges as a conclusion is the limited impact of top down interventions, especially those interventions that try to address poverty alleviation to lower risk. This is essentially because the

poor themselves barricade their own coping mechanisms against external interventions, thus building a wall against external help. Building on local organisational capacity, including religious groups, can help address this problem. Research in this area is limited for the Anglophone Windward Islands and this thesis on vulnerability of household and communities will contribute to knowledge in this field.

The conclusion that top down implementation of DRR does not match a bottom up approach is not new (O'Brien et al, 2010). The observation that there is a barrier, not only because there are few local governance structures, including NGOs, to implement such action but also because the poorest erect a barricade that stops messages getting in or out, is important in reconsidering DRR delivery. Recent research by Grove (2013) argues, in the case of Jamaica, the very delivery of DRR has a logic that problematises adaptation, including mitigation, as the source of, and solution to, the threat that disasters pose to the neo-liberal order. Perhaps vulnerability (poverty) alleviation is not possible in the globalising economy.

This chapter draws conclusions from the main findings of this research and highlights how the research aim and objectives were achieved. The chapter also presents the implication of this study for policy and practice in relation to mainstreaming DRR into community development. Drawing on the conclusions, the chapter also proposes ways that community DRR can be enhanced. Finally, this chapter will close with recommendations for future research.

8.2 Poverty Binds Poor People and Communities Together

Based on the examination of factors affecting vulnerability to hazards in the Anglophone Windward Islands, it is apparent that poverty is a cross cutting theme affecting the ability of households and communities to reduce risk to disasters. These conclusions were drawn from data collected through a questionnaire survey and various qualitative methods such as FGDs, semi structured interviews, participant observation and document analysis. This research found that poverty is tied to a lack of access to resources to build capacity and reduce risks. A number of factors were identified that are likely to increase the vulnerability of the

poor. These factors include a lack of access to secure employment, which result in high unemployment and low paid employment in areas such as farming that are vulnerable to hazards. Another factor is financial insecurity, which means that poor people cannot afford insurance, they have limited, or no cash reserves and are unable to access loans.

This research also found that the poor are more vulnerable as they lack access to secure housing. Many poor people are located in informal settlements with little or no amenities or in unsafe areas that lack mitigation measures. In addition, building codes are not used or enforced and drainage systems are either inadequate or poorly maintained and many homes are in need of repairs. One of the most important factors affecting vulnerability in the study areas is that livelihood options are limited to a few sectors such as tourism, fishing and farming. These sectors can be affected in two ways. First, there is a lack of stable domestic markets and therefore income can be variable. Second for commodities that are exported, such as bananas, the prices are influenced by large-scale producers in South America that can produce such crops at lower prices than the Windward Islands. A further problem is the vulnerability of bananas and livestock to pest and diseases. Similarly, fishing and tourism can also be adversely affected by hazards. This research supports findings from earlier research by Cuny (1983) Lewis (1999), Twigg (2001) UNECLAC (2005) and Manuel-Navarrete, Gómez, and Gallopín (2007)

Disasters can push the poor further below the poverty line. Many poor people choose to live close to their means of livelihood making them more vulnerable, for example, fishing communities have traditionally built their homes near to their boats. On a number of occasions their homes have been destroyed by storm surges and high winds. Despite this, they continue to construct their homes near to their boats, as opposed to locating further away, where they would be less vulnerable. In such communities, people can lose both home and livelihood. People who lose both home and livelihood often struggle to recover from disasters as they lack access to adequate resources to recover fully. Furthermore, it is not uncommon that such communities can be adversely affected by another disaster before they have recovered from an earlier episode. They remain vulnerable to

future event. This was the case in Grenada, which was impacted by hurricanes Ivan 2004 and Emily in 2005. More recently, St Vincent and Saint Lucia were affected by hurricane in 2010 and by heavy rains a few months later.

This research acknowledges that while the non-poor are also vulnerable, the poor are more vulnerable. Certain groups of men and women, the elderly and disabled are also more vulnerable. However, when they are poor the challenges are greater. Examples include poor women with multiple dependents who can become both more dependent on the state and on men after a disaster has occurred. Several authors noted that those mainly affected by recent hurricanes were primarily the poor who occupied flimsy dwellings constructed by the owners in high-risk locations (Manuel-Navarrete, Gómez, and Gallopín, 2007; UNECLAC, 2005). The conclusion is that the poor cope with their poverty and vulnerability but they are not resilient. They cope mainly by developing strong bonds with family, neighbours and the community as a whole. This is related to the second objective, which was aimed at identifying community capacity.

8.3 Community Capacity through Social Capital and Community Mechanisms

This study explored capacity in terms of the existence of mechanisms and networks in a community that help households and the community as a whole plan, respond and recover from the impact of hazards in the shortest possible time. Capacity has to do with having the ability to minimise the impacts of a hazard. The research found that communities in the Windward Islands have certain characteristics, such as close kinship ties, close community networks and support from relatives overseas. This support not only helps communities to develop but also helps them to cope and recover faster than those communities where these connections are less evident. This research confirms the findings of earlier research by Kelman (2007).

This research also found that remote and poorer communities have stronger social bonds and cope better than other communities. There is a high level of social cohesion in the Windward Island study areas, with the highest levels found in Fancy. These findings corroborate research conducted by Harribans and Kathryn (2011) in St Lucia and UNECLAC, (2005) In Grenada. Social capital is important in DRR, but often, isolated communities are dependent on the interests of influential people and groups in the community. Such influence can be misused, benefiting only a few people or small sections of a community. This was demonstrated by political influences in the distribution of relief supplies in communities affected by disasters. This confirms research conducted by Pelling (2002). Key people in a community who are well respected by residents are essential to the promotion of DRR at the community level. In the Windward Islands some key people in the community include sports personalities, religious leaders, police officers, political leaders, teachers, health care practitioners, agriculture extension workers and other community workers.

Good community practices identified in the research include short and long measures and the empowerment of the community. Short-term measures include conducting assessments and the submission of damage assessment reports to the authorities, cleaning up debris, rebuilding and repairing damaged structures and managing shelters and helping those who are dependent on others for care. Long-term measures include the construction of bridges and upgrade of buildings to withstand hurricanes. The empowerment of the community includes the formation of Community Emergency Response Teams and the development of community disaster plans.

8.4 Empowering Civil Society Organisations to Support DRR

The third objective of this thesis was aimed at analysing the effectiveness of community programmes in reducing risk to hazards in the Windward Islands. Community programmes are more effective in some instances, for example, where there is inter-agency collaboration that helps to maximise use of limited resources. Limited human and financial resources were cited as major challenges by the key

informants as a barrier to programme implementation. Civil society organisations without access to such resources may benefit from working with other organisations that are involved in the same communities. The research found that organisations are more effective when they focus on their areas of expertise and incorporate other organisations and persons with additional skills. CSOs in small states are actively involved in DRR programmes but some do not have the capacity to do much.

It was also found that community programmes that are informed by community needs are more effective. One of the critical success factors, which resulted in effective programmes, is the community involvement alongside other stakeholders from beginning and throughout implementation of projects. This supports research undertaken by Anderson (2007) in the Landslide MoSSIAC project that was implemented in several communities in the Eastern Caribbean.

8.5 Enhancing Community DRR

There is need for an enabling environment to support DRR as part of community development and investment of human and financial resources into community DRR. Based on this research it is proposed that DRR is better integrated into community development through the following;

1. DRR integrated with Community Needs – address issues such as the causes of poverty, unemployment, housing, livelihoods, insurance (micro level).

2. DRR integrated into Education Programmes – Schools, Training Academy, and Volunteer Organisations.

3. Integrate DRR with community systems and networks – Churches, Disaster Groups, CBOs, Health, agriculture, sports.

To achieve interventions 1, 2 and 3 there is need to restructure DRR to make use of resources that already exist and at work in the communities. National disaster

plans make provision for the formation of community based disaster structures, but there are few support systems in place. There is need for better guidelines and an improved communications strategy between community organisations and national disaster offices. Most community organisations function around events, such as responding to hurricanes, but they are not consistent in helping to develop the community. The above interventions do not require a lot of additional finance. Many people have received training in key areas in the past. Developing a database of those that are trained in key areas, including volunteers, will provide an indication of human resource capacity.

There is also the need to establish trainers within key agencies through nursing schools, police training centres and teachers training colleges who will help to develop the DRR curriculum within their institutions. The Windward Islands already collaborate at various levels, for example, regional nursing exams and regional police training that allows the sharing of good practice and knowledge. Having DRR embedded in education and training programmes will ensure that this is a continuous process. People that move to other locations or to different employment take their skills with them, making them available to other communities.

Community programmes, whether by government, NGOs or other organisations, should be informed by community needs. The community, with support from other stakeholders, should assess community vulnerability and capacity. Community assessments can be integrated with existing structures in a community, such as schools, churches, clinics and police stations. These institutions are places where people can interact and get information.

Local builders need to abide by national building codes and ensure that they pass on this good practice to their trainees. In conjunction, there should be the development of model houses which utilises building codes that can be used as good practice demonstrations. This can be used for teaching technical subjects, via the media and other forums so that not only builders but also homeowners can better understanding building codes and the relevance of implementing them.

Youth organisations such as cadets, guides and scouts are located in communities and can incorporate disaster management in their programmes. This does happen in some cases. Their members can earn badges and qualifications for their DDR activities. Such activities could include doing community assessments and developing projects and doing activities to reduce risk in both the community in which they reside and where their units are located.

8.6 Concluding Statement

The work presented in this thesis has achieved its aims and objectives by adopting a mixed method approach to address the multi-dimensional issues relating to community DRR. The research has found that there is an imbalance between the vulnerability and capacity of people, especially the more marginalised. This has been largely responsible for the rise in the numbers of people affected by disasters. This was identified during the decade of natural disaster reduction and the message is still the same today. The ratio of those who suffer the most due to a lack of preparedness and increased exposure has not really changed, despite the emphasis on DRR.

The research finds that poverty is the overwhelming reason for the lack of preparedness in the Windward Islands. However, this research also found that the poorest communities had stronger social cohesion and were able to better cope and respond to disastrous events. At the same time such communities were the most reluctant to interact with external bodies.

It is clear from this research that the way DRR is being approached in the Windward Islands is not very effective for the household and community levels. The root cause for that is the inability of the disaster institutions, both governmental and non-governmental, to work effectively at the local level. Lack of resources, both people and money, are additional problems. However, the top-down nature of the disaster system means resilience is aimed at the institutional level as opposed to the community level. This research corroborates studies conducted in the UK (O'Brien, 2006). In summary, this research has contributed

to the understanding of institutional ineffectiveness in the Windward Islands at tackling the real problem; the lack of community adaptive capacity.

8.6.1 Empowering Communities to Build Their Own Resilience

To overcome the problem of ineffective DRR, this research recommends that DRR in the Windward Islands should be decentralised to local communities. The following steps could be taken in communities:-

Step 1 – Communities should develop a database of community assets including people, organisations and buildings. Churches, schools, and community groups can facilitate these processes. This not only creates a database to guide community planning but is also useful for government and other external stakeholders to provide resources to support community development.

Step 2 – Assess the most vulnerable elements in the community including people, places and structures. These tasks can be undertaken through systems within the community, such as health centres developing a database of the elderly and disabled in the community. Agricultural extension officers and farmers unions can assist with the development of a database of farmers.

Step 3 – Identify ways to reduce vulnerability and build capacity and the resources that will be required. Links can then be made to internal and external sources that can assist as noted in step 1. The support can emanate from similar communities in other parts of the country or in other countries with successful DRR examples.

Step 4 – The community could develop multiple ways to tell their stories through drama, song, storytelling, letters and other appropriate creative ways. This could also include models of homes built using codes, mitigation measures, community plans, good agricultural practices and poverty reduction programmes.

Step 5 – Seeking partnerships to support risk reduction from sources both internal and external to the community. This can be done through press releases, articles, lectures, conferences and documentaries.

These steps can be coordinated at the community level but must aim to incorporate as many groups, organisations, clubs and individuals as possible in the community to be effective. Communities are diverse and this diversity can help to enhance DRR if it is used in a positive way. The role of state and other stakeholders are important in helping to build community resilience.

8.7 Recommendations for Future Research

As stated previously in this study there are some areas where future studies can enhance knowledge in DRR in the Windward Islands. Future research needs to explore in more detail, for example, gender in DRR, particularly as it relates to the elderly and single headed households.

The increase of returning residents is also an area that should be addressed, as returnees can be more vulnerable for a number of reasons. There may be a lack of trust of returning residents by local residents. Returning residents may not fully integrate back into the communities to which they have returned. Another area of relevance to DRR is the way people deal with traumatic events. This would need to address gender, age and other factors such as disability and household structures especially that of single parent homes with large numbers of children.

Further research need to be undertaken into land ownership issues including inheritance, family land and land fragmentation and how these issues contribute to and maintain vulnerability. In addition, there is need for studies on squatter settlement and how to reduce further expansion of such areas by addressing land ownership and housing issues.

8.8 Researcher Plan of Action

The researcher plans to review DRR curricula to ascertain if it is feasible to develop an accredited training programme. Initially this would be delivered to the SVG Cadet Force, SVG Police Force and the SVG Nursing School. The aim would be to make the training part of these institutions recruitment programme. The nursing school already incorporate some aspects of disaster management in their curriculum.

In terms of the SVG Cadet Force, the current training programmes will be reviewed and piloted in SVG. The aim is to present a proposal of the programme at the regional meeting of Caribbean Cadet Commandants for incorporation in their training programmes.

In the long term the aim is to extend the DRR training programme to other youth based organisations, such as Girl Guides and Scouts. The aim is to have these curricula reviewed by Northumbria University or other accrediting bodies for accreditation so that the training is certified and can be used as matriculation for future studies.

This dissertation offers two specific contributions to knowledge of disaster management. Firstly, it is the first full study of the Windward Islands vulnerability, attempting to build a people led and people focussed resilience planning effort. The researcher plans to continue with the people led process upon return to work in the disaster management profession in the Caribbean, making use of both public and private resources.

Secondly, this thesis has highlighted that a particular group of people, namely those who are the most vulnerable because they are the poorest, are the most difficult to reach. This conclusion is borne out by parallel work in agricultural extension work and in education. It is not simply a matter of their poverty but their coping mechanisms, which serve to preserve themselves, their family and their neighbours but exclude outsiders. Any intervention in DRR therefore requires more money and effort to reach those most at risk.

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APPENDICES

Appendix 1: Organisations involved in disaster management in SVG

1. Barrouallie Over 35 Club
2. Bequia Disaster Committee
3. Biabou Disaster Committee
4. Brighton Disaster Committee
5. Calliaqua Disaster Management Committee
6. Canouan Disaster Committee
7. Chateaubelair Disaster Group
8. Choppins Community Organisation
9. Colonarie Youth Culture Organisation
10. Dauphine/ Gomea Disaster Management Group
11. Fancy Disaster Committee
12. Fitz Hughes Disaster Group
13. FRIENDS of SDA - Belmont
14. Georgetown Disaster Committee
15. Green Garden GEMS –Peters Hope
16. Greggs Emergency Management Organisation (GEMORG)
17. IMPACT 2000 – Park Hill
18. Kingstown Disaster Management Committee
19. Kingstown Motor Cycle Association
20. Layou Disaster Group
21. Marriaqua Disaster Committee
22. Mayreau Disaster Group
23. Mustique Company
24. Owia Disaster Committee
25. Questelles Disaster Management Committee
26. RELCO
27. ROHCO
28. Sandy Bay Disaster Committee
29. South Rivers Disaster Group
30. Spring Village Disaster Committee
31. Troumaca Disaster Committee
32. Union Island Disaster Preparedness Committee
33. LIONS Clubs
34. SVG Cadet Force
35. Rotary Clubs
36. National Congress of Women
37. Amateur Radio Club

Appendix 2: Household questionnaire

COMMUNITY HOUSEHOLD QUESTIONNAIRE

Questionnaire No ☐

Name of Country _____ **Name of Community** _____

The head of the household or an adult who lives in the home should complete this questionnaire.

SECTION 1: SOCIO DEMOGRAPHIC INFORMATION

1. What is your gender? (**Please tick the correct answer**)M ☐ F ☐

2. What is your age group? (**Please tick the correct answer**)

Under 20	☐	30 – 39	☐	50 – 59	☐
20 – 29	☐	40 – 49	☐	60 and over	☐

3. State your present occupation. (**Please tick the correct answer**)

Self Employed	☐	Teacher	☐	Doctor	☐
Fisherman	☐	Police	☐	Lawyer	☐
Farmer	☐	Nurse	☐	Retired	☐
No paid employment	☐	State Other	_____		

4. What is the highest level of education reached? (**Please tick the correct one**)

Primary School	☐	Secondary School	☐
College	☐	Professional Training	☐
University	☐	State Other	_____

SECTION 2: VULNERABILITY, HAZARD, DISASTER EXPERIENCE

5. How many persons including you, live in the house permanently? (**Write the numbers in relation to male or female**)
Males ☐ Females ☐

6. How many of the persons in your house are in the following groups? **Place the amount in the correct box**).

Group	Number	Group	Number
Sick		Pregnant	
60 years and older		Mentally ill	
Children 5 and under		Disabled	

7. What arrangements are in place for any of the groups above in times of hazards?

_____

_____

8. Which best describes the ownership of your home? **Please tick the correct answer**

Owned by you	☐	Renting	☐
Family home	☐	State other	_____

9. What are the main materials used to construct your home? **Please tick the correct ones.**

Main external walls of the house		**Roof: main materials**	
Brick/Concrete		Tiles	
Mud/dirt		Wood	
Galvanize sheets		Concrete	
Wood/Lumber		Galvanise sheets	
State others materials		State other materials	

10. Do you think your home is a safe place to live? Yes☐ No☐. If yes, skip next question.

11. If No, why not? _____

_____

12. What preparations do you make for hazards e.g. hurricanes, floods, landslides, fires,others?

_____

_____

_____

13. Which of the following hazards have you experienced in the past?

Landslides	☐	Volcanic eruption	☐
Fires	☐	Hurricanes and storms	☐
Floods	☐	Earthquakes	☐

Name any others _____

14. How were you affected by any hazards (hurricanes, floods, landslides, fires) in the past?

Damage to home	☐	Never affected	☐
Damage to crops	☐	Injury to family members	☐
Death of family members	☐	Destruction/Loss of home	☐

State others: _____

15. What form of assistance did you get after the impact of the hazard?

Food Supply	☐	Relocation	☐
Financial Assistance	☐	House repaired	☐
Building materials	☐	Counselling	☐
No Assistance	☐		

State others _____

16. Who provided this assistance?

Church	☐	Neighbours	☐
Friends	☐	Community groups	☐
Family members	☐	Government	☐

State others _____

17. What other type of assistance would you have liked to receive?

Counselling	☐	Building materials	☐
Financial support	☐	Advice on how to rebuild	☐

State others _____

18. Have you ever stayed in an emergency shelter before? Yes☐ No ☐

19. How long did you stay?

Overnight	☐	3 – 4 days	☐	1 week	☐
1 – 2 days	☐	5 – 6 days	☐	1 month	☐
More than 1 month	☐	Other	_____		

20. If yes, how was the experience?

_____

_____

21. What would have made the experience different?

_____

_____

22. Which hazards (hurricanes, floods, landslides, fires, others) are you most worried about? **(Name at least 3)**

_____

_____

23. Why are you worried about those hazards?

_____

_____

_____

SECTION 3: PREPAREDNESS AND RISK REDUCTION

24. Is your home or property insured against any hazard? Yes ☐ No ☐

25. If yes which hazards _____

26. If no, why not? _____

27. Do you have a family emergency plan? Yes ☐ No ☐

28. Any members of your household trained in any the following? **Tick all that applies.**

First Aid	☐	Mass Casualty Management	☐
Shelter Management	☐	Disaster Preparedness	☐
Search and Rescue	☐	Damage and Assessment	☐
List others _____		None	☐

29. Would you be willing to attend training in any of the above if offered in your community?
Yes ☐ No ☐

30. How do you get information on disaster preparedness? **Tick all that applies**

Books	☐	Internet	☐	Booklets	☐
Television	☐	Workshops	☐	Mail in the post	☐
Radio	☐	Newspaper	☐	Church meeting	☐

List others _____

31. How would you rate the information you receive?
Very Good☐ Good☐ Don't know☐ Not good☐ Not very good☐

SECTION 4: COMMUNITY AND SOCIAL CAPITAL

32. How long have you lived in this community

Less than 1 year	☐	5 – 9 years	☐	15 – 19 years	☐
1 – 4 years	☐	10 – 14 years	☐	20 years and over	☐

33. Are you a member of any groups in the community?

Church group	☐	Women's group	☐	Health group	☐
Farmers group	☐			Sports club	☐
Disaster group	☐	Red Cross	☐	None	☐

Name others _____

34. How safe is it to live in your community? Tick the best answer.
Very Safe ☐ Safe ☐ Not sure ☐ Unsafe ☐ Very Unsafe ☐

35. Do you feel accepted in your community? Yes ☐ No ☐

36. If no, why not? _____
_____

37. Does your community have a disaster plan? Yes ☐ No ☐ Don't Know ☐

38. Is there a disaster group in your community? Yes ☐ No ☐ Don't Know ☐

39. What are the responsibilities of this group?

_____

_____

40. Have you been involved in making decisions to help develop the community? Yes ☐ No ☐

41. What has been your involvement? _____

_____

42. Rate the following comments about your community. **Tick the correct answer.**

Questions	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1. People in the community are usually helpful in times of disaster.					
2. There is generally a close relationship between people in the community.					
3. People in the community are usually willing to get involved in activities to develop the community					
4. People in the community generally feel accepted.					
5. The community is divided and people do not interact much with each other.					
6. People usually keep to themselves in times of disasters.					

43. What are the main problems affecting the community? _____

_____

_____

44. What would you like to see improved in the community? _____

_____

_____

_____

45. Which groups are responsible for training and other activities to help develop the community?

_____

_____

46. How do you think the community can be better prepared for hazards/disasters?

_____

_____

_____

_____

THANK YOU KINDLY FOR YOUR ASSISTANCE

Appendix 3: Interview checklist

1. Interviewer: How long has the organisation been in existence?
2. Interviewer: What is the mandate/purpose of the organisation?
3. Interviewer: What is the size of your staff/membership?
4. Interviewer: Do you have a plan/policy to guide operations?
   a. Ask for a copy of organisation policy document
5. Interviewer: What are some of the programmes/activities organised for/with communities?
6. Interviewer: Do you design any of your programmes to target specific groups in the communities?
   a. Which groups and why?
   b. How are these communities identified?
7. Interviewer: What are some of the other agencies/organisations you collaborate with to implement programmes?
8. Interviewer: How do you fund programmes;
   Do you have a committed budget?
9. Interviewer: What are your main challenges in ensuring programmes/activities are implemented?
   a. Can you suggest possible solutions?

Appendix 4: Focus group discussion checklist

Introduction

Good afternoon to everyone. My name is Idelia from St Vincent and the Grenadines. I am a student at Northumbria University, in England, doing studies in Disaster Management. The focus of my studies is communities in the Windward Islands hence the reason I am here in Grenada where I have selected your community to do my research.

I am here to listen to your views on your community and how you cope in disasters. Please note that there are no wrong or right answers everyone is entitled to have their say and we will listen to each other. Please do not interrupt other when they are speaking.

At the end of the session I will leave you with some brochure from the National Agency for Disaster Management which will give you ideas on how to prepare for various hazards and ensure that you and your families are safe.

Remember we will be talking first about how you view your community and then I would like to know about past hazards/disaster in your community, who are in most danger and how do you deal with these events.

Discussion point: Take a few minutes and think about your community, what words come to mind about your community? Would anyone like to add anything else?

Discussion point: I gathered from the questionnaires you completed that most people have lived here for a while and have experience things like earthquakes, hurricanes, floods, landslides and others things that affected the community in the past. ? Can anyone remember dates, name, anything about that event?

Discussion point: I would be interesting to find out what some persons did during any of those events or similar one, how did you deal with it, like how did you prepared or what did you do when it occurred and even afterwards?

Discussion point: I am quite sure there are persons in the community who are in more danger than other from some of the events you mentioned? That might be because of where they live, how they liver or they might not be able to manage on their own. Can anyone identify any such persons?

Discussion point: What about dangerous locations, which areas in the community would you consider most dangerous, why do you think so?

Discussion point: Based on those things we just discuss, events like floods, landslides, hurricanes and the others, your experience (which for some were very scary), dangerous locations and people who would be affected more than others. What resources do you think exist in the community to deal with such things? I could be in terms of people with skills, equipment, safe places.

Discussion point (disaster committee member if present) we have a disaster committee representative, who can share with the plans they have in relation to dealing with these event. Maybe other persons would like to get involved with the committee.

Discussion point: What other resources you think will be needed in the community in preparation for such events?

To round off, we started our discussion by getting your feelings about the communality you live in, and then we looked at events or what we call hazards that have affected your community and could affect your communities again in the future. We then highlighted some persons and places we think are in more danger than others, (that is not to say that everyone should not be aware and make sure they put the necessary things in place). Then we looked at what the community has and what would be needed to prepare for such events.

Is there anything that anyone would like to add, any final word before we close.

Let me offer heartfelt thanks to everyone for turning up and taking the time to share their thoughts. The information I collected here today will be very useful in my studies and I hope to share my results with you in the future.

There are some hand outs from the disaster office that can help you with your preparedness, you can discuss with your family and neighbours. Thanks much and stay safe.

Appendix 5 Deputy Director, Job Description

Ministry:	Ministry of National Security
Department:	National Emergency Management Organisation (NEMO)
Position Title:	Deputy Director
Supervisor's Title:	Director
Position Classification:	Grade 10
Reports Directly to:	Director
Reports Indirectly to:	Permanent Secretary
Supervises Directly:	Community Mobilisation Emergency Operations
Supervises Indirectly:	Executive Secretary Training and PR Disaster Risk Reduction Finance and Human Resource Management

SUMMARY

The Deputy Director is responsible for planning, coordinating and supervising the work and staff of the Secretariat of the National Emergency Office.
The Deputy Director supports the Director in the execution of all the on going and planned disaster management programmes of the organisation and assumes the role of the Director in the absence of the designated Director.
During an adverse event or emergency, the Deputy Director assumes the role of Operations Officer of the National Emergency Operations Centre (EOC), the centre for national coordination for disaster response.

MINIMUM QUALIFICATION AND EXPERIENCE

A Bachelor's Degree in Disaster/Emergency Management or related field.
At least 5 years experience in supervisory position.
Graduate certification in Emergency Management or General Management Studies.
Training in Emergency Operations.

KNOWLEDGE AND SKILLS

Sound Knowledge of the National Emergency and Disaster Management Act, 2006 and the Emergency Powers Act 45, 1970.
Sound Knowledge of the Government policies and procedures.

Sound Knowledge of Disaster Management techniques and systems and systems
Excellent analytical and decision-making skills
Excellent leadership and managerial skills
Excellent human relations, negotiations and conflict resolution skills
Excellent oral and written communication and presentation skills

WORKING CONDITIONS
Normal Office Environment
Frequent Fieldwork and meetings
Community work outside normal working hours
On call 24 hour

DUTIES
Assumes the role of Operations Officer in the EOC when activated

Maintain the EOC at a high level of efficiency; ready to respond to any major event at short notice.
Establish and maintain a roster of staff (Volunteers and Government Designates) who will manage the EOC during its activation.
Ensure that the staff of the EOC receives training appropriate to their functions.
Liaise with the Director to ensure that the EOC is fully equipped at all times.
Conduct regular simulation with the EOC team to identify and correct deficiencies
Analyze information from the field and determine appropriate response.
Ensure that all damage assessment is carried out and produce reports accordingly.

To ensure the maintenance of the Early Warning Systems for all hazards that are likely to affect the country.

Regular liaison with Volcanologist, Director of Agency for Public Information, Commissioner of Police, Director of Airports, Radio Stations and Media Houses, Radio Operators, churches and all other entities with capability or responsibilities for establishment of early warning systems.
Advice the Director on establishment of other early warning systems as necessary.
Liaison with regional and international agencies involved in the provision of early warnings systems for the various hazards.

Establish and maintain a comprehensive Disaster Management Programme for all agencies involved in disaster management in the country.

Analyze strategic and operation plans and programmes of ministries and departments, NGO'S and other organisations in civic society, disaster committees and other community organisations to determine their priority needs in the area of disaster management.

Perform the duties of Facilitator for Training Courses.
Arrange for regional and international training for disaster management personnel.
Work with the Training Officer to identify training needs for all agencies, departments etc. involved in disaster management.

Administration

Prepare annual budget for programmes listed under the Deputy Director duties.
Submit regular reports on programme areas.
Undertake performance evaluations for staff under his/her direct supervision
Ensure all line managers and supervisors carry out their functions in accordance with work plan of the organisation.
To ensure that the day to day operations of the organisation are executed.
Report to the Director on a regular basis on Human Resource issues such as staffing and other activities of the department.
Assist the Director in the preparation of Annual Budget.
To support the Director in all administrative duties.
In the absence of the Director, carry our administrative functions of the organisation.
Reviews monthly progress reports submitted by programme managers/officers and takes corrective action where necessary.

Appendix 6: Participant Consent Form

School of Built and Natural Environment
Ellison Building
Northumbria University
Newcastle Upon Tyne
NE1 8ST

Dear Participant,

My name is Idelia Ferdinand and I am a research student at Northumbria University, UK. I am doing research in Disaster Management and Sustainable Development. As part of my research, I am carrying out a survey on 'Community risk reduction in the Windward Islands'.

This questionnaire is seeking information on hazards, vulnerability, and capacity in relation to hazards as well as people's views of the community. Your assistance in completing a questionnaire will help to achieve the aim of the research. The questionnaire should take about 10 minutes to complete.

Please note that your participation is voluntary and you can withdraw from the research at any time. While the findings of the research will be published, you will not be mentioned by name and any personal information gathered will be held in the strictest confidence.

If you agree to participate, please sign the attached consent forms. If you need to contact me later, my email address is idelia.ferdinand@northumbria.ac.uk.

Your assistance will be greatly appreciated. Thank you very much.

Sincerely yours

Idelia Ferdinand

CONSENT FORM

Please tick the appropriate boxes:

□ I agree to take part in the above research and understand that I can withdraw at any time, without giving a reason.

□ I understand that the data collected will be held in the strictest confidence and my name will not be mentioned in the research.

Signature: _____

Or

Name (please print):_____

Date: _____

Community: _____

Appendix 7: Key Informant Consent Form

School of Built and Natural Environment
Ellison Building
Northumbria University
Newcastle Upon Tyne
NE1 8ST

Dear Participant

My name is Idelia Ferdinand and I am a research student at Northumbria University, UK. I am doing research in Disaster Management and Sustainable Development. As part of my research I am doing a survey on 'Community risk reduction in the Windward Islands'.

Participation in the study would involve an interview, which is expected to last approximately 15 minutes. The questions are related to the key research themes of community risk, community based risk reduction programmes and community development. I would like to arrange an interview at a time and location convenient to you. I am also seeking permission to audiotape the interview.

Please note that the information you provide will be kept in confidence and will only be used for research purposes. Also note that you can stop the interview at any time and withdraw any information given without any explanation.

If you agree to participate, please sign the attached consent forms. If you need to contact me later, my email address is idelia.ferdinand@northumbria.ac.uk.

Your assistance will be greatly appreciated. Thank you very much.

Sincerely yours

Idelia Ferdinand

CONSENT FORM

Please tick the appropriate boxes:

☐ I agree to take part in the above research and understand that I can withdraw at any time, without giving a reason.

☐ I understand that the data collected will be held in the strictest confidence and my name will not be mentioned in the research.

☐ I agree for the interview to be audio taped.

Signature: _____

Name (please print):_____

Date: _____

School: _____

Appendix 8: CDM strategy

GOAL *Regional Sustainable Development enhanced through Comprehensive Disaster Management*			
PURPOSE *'To strengthen regional, national and community level capacity for mitigation, management, and coordinated response to natural and technological hazards, and the effects of climate change.*			
OUTCOME 1: Enhanced institutional support for CDM Program implementation at national and regional levels	OUTCOME 2: An effective mechanism and programme for management of comprehensive disaster management knowledge has been established	OUTCOME 3: Comprehensive Disaster Management has been mainstreamed at national levels and incorporated into key sectors of national economies (including tourism, health and agriculture)	OUTCOME 4: Enhanced community resilience in CDERA states/ territories to mitigate and respond to the adverse effects of climate change and disasters
1.1 National Disaster Organizations are strengthened for supporting CDM implementation and a CDM program is developed for implementation at the national level	*2.1 Establishment of a Regional Disaster Risk Reduction Network to include a Disaster Risk Reduction Centre and other centres of excellence for knowledge sharing and management in the region*	*3.1 CDM is recognised as the road map for building resilience and Decision-makers in the public and private sectors understand and take action on Disaster Risk Management*	*4.1 Preparedness, response and mitigation capacity (technical and managerial) is enhanced among public, private and civil sector entities for local level management and response*
1.2 CDERA CU is strengthened and restructured for effectively supporting the adoption of CDM in member countries	*2..2 Infrastructure for fact-based policy and decision making is established/enhanced*	*3.2 Disaster Risk Management capacity enhanced for lead sector agencies, National and regional insurance entities, and financial institutions.*	*4.2 Improved coordination and collaboration between community disaster organizations and other research/data partners including climate change entities for undertaking comprehensive disaster management*
1.3 Governments of participating states/ territories support CDM and have integrated CDM into national policies and strategies	*2.3 Improved understanding and knowledge sharing on priority hazards*	*3.3 Hazard information and Disaster Risk Management is integrated into sectoral policies, laws, development planning and operations, and decision-making (in the tourism, health and agriculture sectors, planning and infrastructure*	*4.3 Communities more aware and knowledgeable on disaster management and related procedures including safer building techniques*
1.4 Donor programming integrates CDM into related environmental, climate change and disaster management programming in the region.	*2.4 Existing educational and training materials for Disaster Risk Reduction and Disaster Management are standardized in the region.*	*3.4 Sectoral Prevention, Preparedness and Response/Mitigation Procedures developed and Implemented (in the tourism, health and agriculture, planning and infrastructure*	*4.4 Standardized holistic and gender-sensitive community methodologies for natural and anthropogenic hazard identification and mapping, vulnerability assessments and early warning systems developed and applied in selected communities.*
1.5 Improved coordination at national and regional levels for disaster management *1.6 Capacity for monitoring, evaluation and reporting is built*	*2.5 A Strategy and curriculum for building a culture of safety is established in the region*		*4.5 Early Warning Systems for disaster risk reduction enhanced at the community and national levels*

Appendix 9: Hazard Profiles

Hazards Profile Dominica

Date	Event	Cost	Impacts	Communities affected
1916, August 28	Tropical Storm	EC$ 33, 000	50 killed, Rivers washed away bridges and culverts, streams changed courses, flooding, over 200 houses, schools, churches and other building wrecked or seriously damaged. 8 Local crafts lost, telephone and electricity disrupted, lime and other crops damaged. 8 Ships lost.	
1926, July 24	Hurricane		Trees uprooted damaging buildings, damage to telephone and electricity systems	
1928, September 12	Tropical Storm		Sea front damage. Extensive damage to building and cultivation	
1930, September 3	Tropical Storm		2 killed, serious damage to public buildings, telephone, roads. Loss of entire year crop,1000 houses destroyed, 850 damaged,	
1930, September 19	Riot (Carib)		5 killed, Carib rising on 19 September against police searching for smuggled goods. In retaliation, a warship, HMS Delhi is called, star shells are fired over the territory, and the police killed Caribs. Carib Chief, Jolly John, is stripped of his official position and Chief's staff and sash are taken away.	
1935, February 4	Earthquake			
1945, May 21	Earthquake, 7.0		Crockery and glassware damage.	Roseau
1948	Tropical Storm		Landslides and destruction of forests.	
1949	Tropical Storm		20 dead, limited info	
1953, March 19	Earthquake		Cathedral Clock stopped	Roseau
1954	Earthquake			
1955	Hurricane Janet			

Date	Event	Cost	Impacts	Communities affected
1960, July 13	Hurricane Abbey	-	A roof collapsed on a house, killing 6 residents.	
1963, September 25	Edith	US$ 2, 600,000	Destroyed 50% fruit trees	
1964	Fire			
1966, June	Tropical Storm		Flooding	
1971 - 1975	Drought			
1970, August 20	Hurricane Dorothy		Wind damage, river flooding, damage to bananas	
1975, May 21	Vehicle Accident		28 killed	Morne Prosper
1977	Landslide		8 killed, 4 homes engulfed	Bagatelle
1979, May 29	Insurrection Social Unrest		1 killed, Change of Government	
1979, August 29	Hurricane David, Cat. 5	EC$ 53,000,000	About 40 killed, 81,000 affected, 3000, injured, 60 % homeless, 50% housing damage, 2000 houses completely destroyed, 8,670 of the 15,000 dwellings lost roofs. Main port badly damaged, require reconstruction (EC$10.8/US$4 m). US$ 2.2 M to rebuild or repair 64 schools. Economic fall off lasted years, Utilities affected, Economy and agriculture affected. 20,000 migrated, social dislocations. 75% fishing fleet destroyed. All means of communications, energy and drinking water was interrupted. Agriculture and livestock seriously affected.	Island wide devastation
1979, September 1	Hurricane Frederick			
1980, August 4	Hurricane Allen		Economy, Agriculture affected	
1981	Coup Attempts		3 killed, 9 wounded	

1984, October 9	Hurricane Klaus	US$ 2,000	2 killed, 10,000 affected, 20 - 25% damage to banana crops.	
Date	**Event**	**Cost**	**Impacts**	**Communities affected**
1989, September 17 - 19	Tropical Storm Hugo	US$ 20,000	710 affected, 70 - 8- % bananas destroyed, US 5 M damage, destruction of properties and infrastructure. 18% decline in agriculture. 30% decline in banana exports.	
1990, April, 27	Fire			
1994, September 9 - 10	Tropical Storm Debbie	Crops and Fisheries EC$30 M/US$12 M	Damage to roads, power outages. Damage to 2,800 acres of bananas, 143 acres of plantains, 355 acres of root crops, and 355 acres of tree crops.	
1995, August 25	Tropical Storm Iris	EC$ 192M agriculture, EC$ 14.5 M Root crops,	175 affected. Forestry and fisheries sectors affected. EC$174 M for the reconstruction of basic infrastructure.	
1995, September 3	Tropical Storm Luis		2 killed, flooding, 1000 homeless, 5001 affected, agriculture and housing affected. 10 fishing boats destroyed. Damage 60 - 80% banana crop. Property damage US$ 47,000.	
1995, September 14	Tropical Storm Marilyn		US$175,000,000, Landslides blocked Layou River and formed dam. Damage to buildings, agricultural roads, bridges and the environment.	
1997	Volcanic Activity			Valley of Desolation
1997, November 18	River flooding and Landslide		Mattheu Dam tributary to the Layou River	Layou

Date	Event	Cost	Impacts	Communities affected
1998, August 25	Transport Accident		11 killed	
1998	Hurricane Georges			
1999, November 17 - 19	Hurricane Lenny	EC$ $21.5 million 8.8% GDP	2killed, 715 affected, 8.8% GDP, coastal damage, damage to roads and sea defences, airport closed, storm surges 30 - 40 ft. EC$ 2.7 M damage to housing. EC$ 0.6 M to tourism infrastructure and hotels, EC$ 4.2 M to community and government buildings. Damage to Roseau Fisheries Complex. Assessment is on going in Dominica, 29km Roads in Scotts head and Capuchin damaged. Direct link from Portsmouth to Roseau and from Soufrière to Roseau affected. 36 wooden houses at Baytown, Pointe Michel, Loubiere, Newton, Mahut and Les Pointe reportedly destroyed and several others damaged Extensive damage to Western Coastline and road, Newly built fishing Complex damaged. Bay Front area suffered coastal flooding Banana collection postponed. Roseau, the capital, was cut off for a few days from petroleum storage facilities and northern section of the country including its two airports. Pottersville to Rockway road was closed until it could be repaired.	Soufrière, Scotts, Head, Pointe Michele, Villages of Capuchin and Clifton cut off from Portsmouth.
2001, October 6	Tropical Storm		1 killed, 175 affected	
2003	Landslide		2 killed, Agriculture, tourism	Carholm Flood Prone/hazard area

Date	Event	Cost	Impacts	Communities affected
2004	Rainstorm (3 days)		Landslides, flooding, 1500 cut off from the rest of the island in Grand Fond, Rosalie, Good Hope, Laplaine, Delices, RiviereCyrique, Scottshead and Petit Soufrfiere.	Grand Fond, Rosalie, Good Hope, La Plaine, Delices, Reviere, Cyrique, Scotts Head
2004, November 21	Earthquake 6.0	EC$90,000,000 US$ 19.1 M repairs	19, 527 affected, 25 seek shelter. Loss of electricity to 70,000. Serious damage. Infrastructural damage to buildings including 2 historic churches. Portsmouth Hospital was evacuated due to structural damage. Melville Hall Airport was closed for the day, 8 flights re-routed. Crops affected, blocked roads. Blocked road in Portsmouth delayed assistance	Northern part of the Island, St. David, most severely felt in St. John and the Northern end of St. Andrew.
2005	Hurricane Emily			
2007, November 29	Earthquake 6.5		Housing, infrastructure,	North declared disaster area
2007, August 21	Hurricane Dean, Cat. 1	**Tot EC $98,590,000**	2 killed, 7, 530 affected, 30 injured. About 183 homes lost roofs completely, 205 houses partial roof damage, 43 houses completely destroyed, 115 houses significant structural damage, 225 other buildings damaged. Over 700 buildings damaged. agriculture and housing affected, 1, 500 houses damage, loss or roofs, damage to crops, phone lines downed, damage to roof of main hospital (EC$ 3 M), flash floods. Road blocks, landslides. Sea wall damage (EC$ 15.5 M), Coastal bridges (EC$ 15 M), Road network (EC$ 17.6 M), River walls (EC$ 45.5 M), 95% agricultural crop loss, 99% loss of bananas	
2008	Hurricane Omar storm surge		Coastal damage, sear surge 20 to 30 ft.	

Date	Event	Cost	Impacts	Communities affected
2009	Series Earthquakes		Portsmouth, Sanvanne Paillem, Toucarie, Penville, Vielle Case, Guillette, Clifton, Salisbury	
2010, May 24	Landslide		3 killed, 2 homes destroyed, 1 family evacuated	San Sauveur
2011, July 29	Mathieu Dam collapsed		Ecological disaster declared in the Layou Valley. Some areas impassable due to damage to bridge, complete destruction of an agricultural propagation station, 13 private dwellings affected, the centre of the Clarke Hall Bridge washed away and impassable, damage to roads, infrastructure, agriculture and utilities, second breach to the dam resulted in flash flood and landslides.	
2011, September 25	Tropical Storm Ophelia		180 households affected, 240 affected. Torrential rain, flooded rivers. Flooding isolated Layou village, many landslides in washed away cars, flooded homes, blocked roads. Water and electricity disrupted.	Canefield, Massacre, Mahaut, Cochrane, Coulibistrie and Campbell

Hazard Profile Grenada

Date	Event	Cost	Impacts	Communities affected
1915	Tropical Storm		Damage to 20 - 25 acres cocoa, damage to roads and 3 bridges.	
1921	Tropical Storm		Damage to cocoa and other trees, communication and shopping affected	
1954, October 7	Tropical Storm		Trees uprooted, housed blow down, damage to road and electricity.	
1954, December 4	Earthquake		Minor cracks of wall in buildings, St Georges	
1955, September 22	Hurricane Janet		500 killed, 75% nutmegs destroyed, coconut trees up rooted, 6, 000 dwellings destroyed, 20 of 50 schools seriously damages, loss to agriculture.	
1964, September 24	Hurricane Edith		Minor damage.	
1963, October 1	Hurricane Flora	US$25,000	6 killed damage to airport and roads.	
1965, September 30	Tropical Storm		6 killed	
1970 - 1975	Drought			
1975, November	Flood	US$ 4,700		
1979	Coup		New Jewel Movement of Maurice Bishop overthrew government led by Eric Gairy.	
1980, August 4	Tropical Storm	US$ 5,300,000		
1983, October 19	Coup		Bishop and 10 men killed, extremist Marxist executed PM Maurice Bishop and 4 cabinet ministers. 17 men were convicted of the killings that prompted a US invasion. Death sentences were commuted to life in prison. In 2005 they appeal to the London Privy council.	

Date	Event	Cost	Impacts	Communities affected
1983, October 25	Invasion		45 Grenadians were killed along with 29 Cubans and 19 Americans. 1,800 US Marines and Rangers, assisted by 300 soldiers from six Caribbean nations, invaded Grenada at the order of President Reagan, who said the action was needed to protect US citizens there. Protection for the American students at St. George's Medical School was a pretext for the invasion.	
1986,	Tropical Storm Danielle		68,000 banana plants affected, 100 acres of bananas, 18.9% export for 1986. Other agricultural impact to cocoa trees, nutmegs. EC 413, 000, damage to road EC$ 400,000.	
1990, July 26	Tropical Storm Arthur		1000 afffected	
1999, November 15	Hurricane Lenny	$94,300,000	210 affected, tourism, sea defences and road damaged. All schools on the western side of the island remain closed There is no access to some villages due to badly damaged roads. 21 small craft lost 40 persons displaced 10 houses destroyed 2 jetties damaged Hurricane Lenny destroyed a number of beachfront restaurants and other facilities, and caused significant beach erosion at a number of tourism destinations. It also accelerated the erosion adjacent to the runway of the international airport, threatening to undermine one end of the runway.	Grand Anse Bay, S Victoria

Date	Event	Cost	Impacts	Communities affected
			Grenada and Carriacou, which were South of Lenny's path, also suffered extensively from wave damage. The greatest damage was concentrated along the West Coast of Grenada from Grand Anse Bay (Grand Anse Beach) in the South to Victoria on the St. Mark Bay to the North. Grenada's West Coast towns were cut off from the capital, St. Georges. There was a fuel shortage on the island as the main fuel storage facilities, located at Grand Mal, were cut off on either side from the main West Coast road. The St. George's Harbour received a pounding destroying several small craft, two floating structures and damaging sidewalks and roads. Beaches along the West Coast were severely eroded. In the case of Grand Anse Beach, which is widely acclaimed for its wide expanse of white sand, the sea had encroached so far inland that the beach had all but disappeared. In Carriacou, the road to the airport had been washed away as well as the sea defences in the area.	
2004, September 7	Hurricane Ivan, Cat 3	EC$ 889,000,000	28 killed, 80,000 affected, major damage to agriculture and vegetation. 70%, 555,000 nutmeg trees affected. Destruction of wooden houses and damage to roofs of houses in general. Island wide disruption of telecommunication, water and electricity. Schools suffered 75% of major damage except for 2. More than 2x the country's GDP. 90% homes damaged.	Island wide devastation but mainly St Georges, St David, St John, St Andrew

2005, July 05	Hurricane Emily, Cat. 1		1 killed, 1, 650 affected	
2008,	Hurricane Omar storm surge			
2011, April 12	Rainstorm		One house partially destroyed, several homes flooded, Bathazar River, St Andrew breached the bridge	

Hazards Profile Saint Lucia

Date	Event	Cost	Impacts	Communities affected
1911, February 7	Rainstorm		11 killed, 10 flash floods, landslides	Mabouya, Vales, Roseau
1921, September 10	Tropical Storm		15 killed, Cocoa damages, damage to ship and communication.	
1927, May 14 - 15	Fire		17 blocks burnt	Castries Town
1928	Tropical Storm		Crops destroyed at Roseau, roads destroyed, fish market and jetty swept away	
1933, November 7	Rainstorm		3 killed, landslides	
1935, February 24	MV George Overturned		41 drowned	
1937	Drought			
1937, February 13	Sinking of May Rose		12 drowned	
1938, November 21/22	Landslide		100 killed	Ravine Poisson
1939, January 7	Tropical Storm		3 villages destroyed, 100 dead, 250 missing.	
1940, August 7	Tropical Storm		Damage to livestock and plantations, roads and walls swept away	Ravine Poisson, Barre de L'Isle and L'Abbaye
1943	Fire			Castries
1946, May 21	Earthquake		Building damage in particular the Castries RC Church, government buildings, stores, homes.	Castries
1948, June 19/20	Fire		2,300 homeless	
1953, March 19	Earthquake, 7.3		Partial building collapse (fire) other building damage.	Castries
1954, December 12	Tropical Storm		Landslides, damage to bananas and other crops	Castries, Ravine Poisson
1955, June 9	Fire	EC$1.25 M	3 killed, 2000 homeless, 7 blocks, 478 houses lost	Soufrière Town
Date	**Event**	**Cost**	**Impacts**	**Communities**

				affected
1955, September 22	Hurricane Janet		Jetties damaged or completely destroyed in Choisel, Vieux Fort and Soufrière. Waves of 15 – 20 feet recorded. Drum piers for storage of Coconut Oil belonging to Copra Manufacturers were heavily damaged. The public latrine and one house were washed away to sea. Agriculture: Loading was not possible as the Vieux Fort Jetty Damaged. Twenty Five [25] Coconut trees were washed into the Soufrière Bay.	
1957, March 25	Labour Unrest		Cul de Sac, Dennery, Roseau	
1958, July 4	Tropical Storm		Loss of bananas	Dennery, Soufrière, Vieux Fort
1960, July 10	Hurricane Abbey	EC$435,000,000	6 killed, landslide at Fond St. Jacques. Destroyed bananas, coconut and cocoa. Damage to roads, bridges, electricity.	
1963, September 25	Hurricane Edith	EC$3/4 M	10 killed, destroyed banana trees, damage to road, bridges and electricity.	Northern and Eastern districts
1963, October 1	Tropical Storm		40% damage to bananas.	Areas close to Castries
1966, June	Tropical Storm		Damage to road and communications	Northeast area
1966, August 1	Tropical Depression	EC$3/4 M		
1967, September 7	Tropical Storm Beulah	EC$2,000,000	1 killed, (18) collapse of roads, soil erosion, damage to bananas, roads and bridges	
1970, October 2	Tropical Storm		Damage to roads	
1970 - 1975	Drought			
1972, March 23	Building Collapse		People injured, upper part of training college collapsed	

Date	Event	Cost	Impacts	Communities affected
1973, October 29	Plane Crash		3 killed	Mt Gimie
1979, June 24	Riot		Majority of shop windows smashed	Castries
1979, August 29	Hurricane David		Coastal damage	
1980, July 31	Tropical Storm	EC$69,000	9 killed, 80,000 affected, 90% bananas destroyed, 80% agricultural output.	
1980, August 4	Hurricane Allen, Cat 3	EC$250,000,000US$ 100,000,000	18/9 killed, 6,000, homeless, 80,000 affected.	
1981, November 30	Plane Crash		3 killed	
1983, September	Tropical Storm	US$1,290	3000 affected	
1986, September 7	Tropical Storm Danielle		10% bananas, loss large estates	
1988, September, 11	Tropical Storm	-	45 killed, 750 affected	
1990, October	Earthquakes	EC$ 10,000	Series of earthquakes, 68 homeless, destroyed several concreter structures and public utilities	Black Mallet/Maynard Hill
1992, November 6	Landslide	EC$10,000	68 homeless	Morne du Don
1992, November 29	Landslide	EC$ 10,000	10 families affected, 36 persons.	Bocage
1992, November	Floods		Several roads impassable, damage to homes and infrastructure, disrupted businesses	
1993, October 9 - 10	Civil Unrest (Banana industry)		2 killed, demonstration	Dennery
1994, September 10	Tropical Storm Debby	EC$250,000,000 US$103,000,000	9 killed, 2 missing, 750 affected, 600 moved to shelters, over 400 landslides, 6 bridges completely washed away, 4 heavily damaged, damage to roads. Agriculture, coral reef affected. Loss of water, telecommunication and electricity services. Flooding in Anse Le Raye.	Dennery, Anse La Raye, Soufrière - Fond St. Jacques

Date	Event	Cost	Impacts	Communities affected
1995, October	Oil Spill	EC$3,257.63 (Claims)	93 barrels of Arabian light crude oil	Cul de Sac
1996, February 1	Fire		Victoria Hospital	Castries
1996	Earthquake, 4.8			
1996	Mass Movement		175 affected	
1996, February 11	Fire		10 families displaced	Patterson's Gap
1996, October 26	Floods	EC$12,000,000	Severe damage in affected areas	Soufrière, Anse La Raye, Castries, Vieux Fort
1996, October 21	Tropical Wave	EC$621,500	3 families displaced , 1 dead	Vannard, Anse La Raye, Surbuilt, Castries
1996, October 31	Floods		South of Castries cut off from the north	Castries
1998, October 14	Landslide		12 households, 49 people affected	Bougis
1999, June 3	Oil Spill	US$1,168.50	4000 gal in Choc River	
1999, September	Landslip	EC$1,000,000	102 families relocated	Black Mallet/Maynard Hill
1999, November 19	Storm		200 affected	

Date	Event	Cost	Impacts	Communities affected
1999,	Hurricane Lenny	EC$6,600,000	200 affected, 11% GDP West Coast affected by the wave action Soufrière battered by waves over 10ft. 7 houses destroyed, persons moved to shelters. Damage to fishing boats in Choiseul and Laborie Soufrière, Gros Islet, Anse La Raye, Choiseul. Beach erosion on the Northwest coast. Roads and pedestrian walkways to the beaches washed away. In Soufrière portions of its waterfront had been inhabited by a fishing community as well as a community of squatters. The squatters constructed some 100 houses of poor construction standards and many of them were severely damaged. An additional 21 houses of concrete block were damaged as was the seawall. The adjacent road was destroyed. In addition, the rising floodwaters from a river that runs through the town added to its inundation. While this flooding is not just specific to Lenny, when this happens, it cuts off the hospital from the rest of the town.	Soufrière, Gros Islet, Anse La Raye, Choiseul
2000, October 17	Clay products Spill	EC$3,988	45 gal oily water discharged into the Cul De Sac River	
2000, December 31	Attack at Cathedral	EC$20,000	Attack at Basillica Minor at the Cathedral of Immaculate, 2 killed, 12 burnt	
2002, September 22-23	Tropical Storm Lili	EC$20,300,000	125 in sheltered	
2003, July 7	Tropical Wave	EC$3,007,000	Damage to banana sector estimated at 3 million	

Date	Event	Cost	Impacts	Communities affected
2004, June 06	Fire	EC$450,000.00	51 homeless, 13 homes destroyed	Barnard Hill, Conway
2004	Hurricane Ivan	EC$6,981,000 US$2,600,000		
2004, September 26	Landslide		Destabilisation of 2 concrete structures, ruptured public utilities, road to Tapion Hospital impassable disrupting service for 4 days. Damaged house subsequently fell apart.	
2005,	Hurricane Emily			
2007, August 17	Hurricane Dean	Total cost EC$ 17.3 M (US$6.4 M)	1 killed, loss of house roofs, homes completely destroyed loss of roof Victoria Hospital, damage to roof of St Jude Hospital. Power outage, trees downed, Vigie airport closed, damage to coastal areas and roads, erosion of shoreline, part of main road impassable. Damage and sinking of boats. Flooding. Damage to bananas in Mabouya Valley, Roseau Valley and Marc Marc. 75% crop loss. EC$ 800,000 housing and buildings. EC$ 700,000 coastal damage, 300,000 schools, 900,000 to clean roads and drains, 505,000 utilities and communication, 922, 000 Air and sea port.	Micoud, Dennery, Anse La Raye, Castries
2008	Hurricane Omar Storm Surge		Coastal damage	
2010, October 06	Floods		2000 affected	

Date	Event	Cost	Impacts	Communities affected
2010, October 31	Hurricane Tomas	EC$907,000,000	10/14 killed, evacuation of 1000 in Fond St Jacques, over 120 families in Canaries affected, over 100 homes destroyed, damaged or inundated by mud. Soufrière completely cut off by landslides, 80 - 100% damage to bananas, Hewanorra airport temporarily closed. Communication severely affected island wide, disruption to electricity and telecommunication. Several radio stations off air. John Compton Dam inaccessible due to landslides, damage and loss of power to pump hose. Damage to water distribution system in the north. Major damage to roads and bridges - Choc and Bouis D'Orange. Gros Islet highway damaged.	Island wide, most severely Soufrière, marc, Bexon
2011, November 28	Vehicle Accident		17 killed, National Day of mourning	

Hazards Profile St Vincent and the Grenadines

Date	Event	Cost	Impacts	Communities affected
1916, October	Tropical Storm		Flooding due to heavy rain	
1928, September 28/26	Earthquake			
1939, April 20	Earthquake		Damage to several buildings	
1946, May 21	Earthquake		Damage to buildings including Kingstown public library	
1953, March 19	Earthquake 7.5		Building damage - in Kingstown include hospital, police barracks and stores. Roman Catholic Church destroyed at Gomea	
1955, September, 23	Hurricane Janet		122 killed, crop damage, coastal roads.	
1958			Prolong dry period	
1967, September 8/17	Tropical Storm Beulah		2 killed, damage to bananas	
1970 - 1975	Drought			
1971, September 8	Volcanic Eruption		2000 affected, 10,000 evacuated, 40% decline in agricultural output after eruption.	
1974, October 2	Tropical Storm		Landslides, damage to plantations	
1977	Flood			
1979, April 13	Volcanic Eruption	EC$ 13,784,797 (100,000,000) SRC website	2 killed, 20, 000 evacuated , extensive agricultural damage	
1980, July 31	Hurricane Allen	US$16,300	20, 500 affected 16.3 million	
1986 Sept 21 & 22	Flood		152 affected	

Date	Event	Cost	Impacts	Communities affected
1986, September 8	Tropical Storm Danielle, Flood		125 affected. 40% banana cultivation affected (EC$16.5 M), 2 M agricultural crops, 2 M housing and buildings, 0.5 M infrastructure.5 Persons seriously Injured 436 Houses affected, over 100 completely destroyed. 142 persons evacuated to shelters Heavy flooding and landslides Damage to bridges and roads Damage and disruption to water and electricity 40% Banana cultivation damaged or destroyed 2,050 acres other agricultural crops damaged 120 Domestic animals killed On Saint Vincent, the winds caused a major power outage, while heavy rainfall left crop damage. Another rain system affected the country a few weeks later, and the combined monetary damage totalled $9.2 million (1986 USD, $18 million 2010 USD); 142 people had to seek shelter after their homes were destroyed, and a total of 436 dwellings were impacted to some degree	
1987, September	Flood	US$5,000	1000 affected	CRED/*EM-DAT*
1987, September 21	Hurricane Emily	US$5,300	208 affected, Agriculture, Housing, Marine, Infrastructure, Road Network, Social and Economic Sectors affected. Approximate cost EC$12.7 Granted Emergency loan of EC$104 M for rehabilitation of bananas	
1992 November	Flood		3 killed, 200 affected, People left homeless, houses washed away, homes flooded and inhabitable, large landslides, airport temporarily closed.	

Date	Event	Cost	Impacts	Communities affected
1999, November 17/ 29	Hurricane Lenny, Storm Surge Cat 4/5		100 affected Extensive coastal damage Affected the west coast and the Grenadines Storm surge caused damage to marine infrastructure and roads.	
2002, September 24	Tropical Storm Lili	EC$977,948.74 for relocation	4 killed, 500 seeked shelter, over 30 houses destroyed, over 700 houses damaged. Coastal damage, agricultural sector affected, education and health sector affected, 16 houses relocated	Sandy Bay, Georgetown, Rose Hall
2004, September 08	Storm		1004 affected	
2004, September	Hurricane Ivan Cat 5	EC$10 million	777 houses severely damaged 56 houses completely destroyed 333 persons sought emergency shelters Over 200 families earmarked for relocation along the Eastern coast.	
2005, Jul 14	Hurricane Emily	EC$10 million	533 houses severely damaged, 530 affected 18 houses completely destroyed.	
2005, August 15	Tropical Storm Earl			
2007,	Hurricane Dean	EC$ 2.2 million for Relocation of families	Destroyed 10% banana crops, 7 houses destroyed 6 fishing boats destroyed Relocation of families estimated	
2007, Nov	Earthquake 6.4		Damage to buildings	
19-Sep	Heavy Rain		1 killed, landslides.	

Date	Event	Cost	Impacts	Communities affected
2008	Hurricane Omar Storm Surge Cat 3	5 M (plus in losses)	Affected the Storm surge affected SVG leeward coast line and the Grenadines The Hurricane directly affected the Leeward Islands. Damage to coastal infrastructure – Hotels, beaches, sea defences, jetties, fishing vessels and other vessels, port facilities and many other businesses.	
2009	Oil Spill			
2009 - 2010	Drought		Forest Fires, reduction in water supply in reservoirs and rationing of water. Damage to agriculture and price escalation.	
2010, October 29	Hurricane Tomas	EC 84,950,000 US$25,000	2 persons injured, 6100 affected, 1200 homes damaged, 20 homes completely destroyed. 5 schools, 1 community centre, 1 government doctors quarters damaged. Widespread damage in the agricultural sector, bananas and plantains almost 98% destroyed in affected areas. Tree crops and vegetables severely affected. Damage to water, telecommunications and electricity services. Landslides, Windward	North Eastern side - Park Hill, Chester Cottage, Sandy Bay and Byera. North Western side - Chateaubelair Coulls Hill, Spring Village and Fitz Huges.
2011, April 11	Heavy Rain/Flooding		275 affected, 60 persons homeless, highway blocked at several points. Several rivers overflowed their banks and flooded houses. Byera and Mt Young bridges compromised. Langley Park bridge completely washed away, cutting off the area from the rest of the country.	Peruvian Vale, Mt Young, Georgetown, Langley Park, Dickson, O'Brien's Valley